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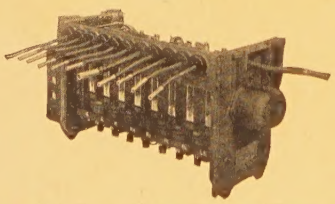
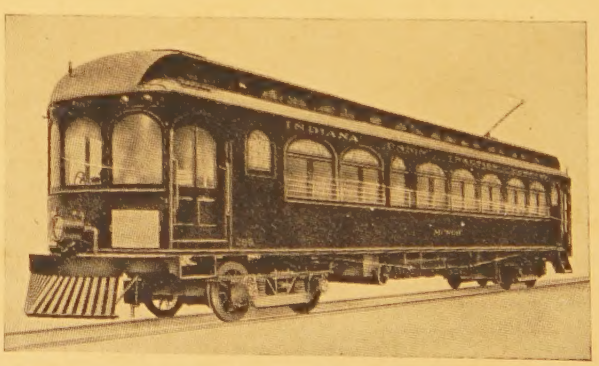
"JOE," said the general manager to his master mechanic, "what was the trouble on the car that blocked the line last night?"

JOE, who was just going to mention the matter, answered: "Well, it was simply a grounded motor, and the noise and flash at the circuit breaker, when it opened, scared the passengers, and, in the scramble, one or two were injured. That new Westinghouse HL Control would have prevented this, all its heavy-current carrying parts being located under the car. I just heard the Boston Elevated Co. have ordered fifty of these controllers for their new cars. They also got that No. 306 Westinghouse motor I spoke to you about, and when I was down in Indiana last week I was told the "Marion Flyer" of the Indiana Union Traction Co., is equipped with this new HL Control and No. 303 motors, and has been making about 350 miles a day since July without a delay or complaint of any kind."



Switch Group, Hand Operated Type

Platform Controller



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A CONSOLIDATION OF

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"Deceleration" or "Retardation"

We are glad to second the protest made by C. O. Mailloux, in the current issue of the *Transactions* of the A. I. E. E., against the use of the words "deceleration" and "decelerate," because the same ideas can be expressed by the words "retardation" and "retard," which are etymologically correct. In an industry which grew so quickly and is still expanding so rapidly as the electrical industry it is not surprising that some barbarisms should have crept into the nomenclature employed. Certain of these have been used so long to designate a particular kind of apparatus, or some special process or effect, that they seem to have become engrafted on our language. This is not true, however, with regard to "deceleration" and "decelerate," which are based on a misconception of the fundamental meaning of the word "accelerate" and are philological counterfeits. It may not be possible to purify the English language from all of the questionable terms which have come into it as a result of the electrical industry, because in many cases there is no proper and well-recognized equivalent. But this is not the case with "deceleration" and "decelerate," and the effort to abolish these words from exact writing should have the support of all.

Larger Depreciation Fund in St. Louis

A still further increase in the percentage of gross earnings set aside for depreciation has been made by the United Railways Company of St. Louis. According to the annual report of President Robert McCulloch, an abstract of which is published elsewhere in this issue, the charge of 10 per cent of gross for this purpose is due to the fact that experience had shown that this proportion was "required to provide for the present annual depreciation of the property." The allowance for depreciation was computed upon the total gross revenue and amounted to $1,153,777—that is to say, it was computed upon the revenue from transportation plus the revenue from operation other than transportation. The operating expenses were 52.8 per cent on $6,096,794 of the gross earnings, so that the total of the expenses and the depreciation charge was equal to 62.8 per cent of gross. The taxes were not included in these expenses and amounted to an additional expenditure of 5.7 per cent of gross. It is unfortunate that the report does not give the details of operating expenses as charged. They would show the proportion of earnings applied to maintenance before the expenditures on this account were supplemented by the appropriations for depreciation. The policy under which the United Railways started the establishment of a depreciation reserve fund was inaugurated in 1905, when 5 per cent of gross was set aside. This rate was maintained annually until the middle of 1909. The rate was increased then to 6 per cent, and the total reservation for 1909 was equal to about 5.5 per cent.

Improving Old Shops

Time and money expended in the improvement of old repair shops on systems where the conditions do not justify the erection of new plant for maintenance purposes seldom fail to return high rates of interest. It pays to go over such properties thoroughly every year or two in the effort to improve the conditions of production, for, irregular as may be the work of rolling-stock maintenance even on a large system, it has many points in common with routine production in the factory. A recent survey of machine shop practice disclosed the need of the following improvements, many of which are capable of immediate application in electric railway service: The increasing practice of making patterns locally necessitated the enlargement of a pattern storage annex to contain all patterns used on the system in orderly classification; the erection of a small, temporary storage room for the reception of machine and supply parts stripped from equipment undergoing overhauling was desirable, as it obviated trouble from the accumulation of scattered material around the yard and the frequent loss of good stock carelessly thrown into the scrap bin; the provision of an electric drying stove to be installed for use in connection with a blueprinting outfit. Other needs were the replacement of a decayed and broken wooden floor with one of concrete, surfaced with new boarding, and with the electric wiring for machine tools transferred to pipe conduit beneath the floor instead of being allowed to run loosely through the shop, and the installation of overhead crane facilities, with a stronger roof construction.

The Neck of the Bottle

On Jan. 23 the Interborough Rapid Transit Company began operating the first of the 10-car express trains in the New York subway. As soon as all the station platforms have been lengthened to accommodate longer trains all the express trains will have 10 cars and the local trains will be increased in length from six cars to eight. The maximum possible number of trains is now being operated during the rush hours and no further relief from congestion of traffic can be expected after the longer trains are put on. When the subway was first opened the Brooklyn Bridge terminal was the point of greatest congestion and delay to trains. Later the junction of the Broadway and Lenox Avenue divisions at Ninety-sixth Street became the critical point as the number of trains was increased. The separation of grades at this point was avoided by the introduction of speed-control signals which permitted the passage of trains through the junction at closer intervals than were allowed by the length of station stops below Ninety-sixth Street. The time of station stops was next reduced by fitting the cars with center-side doors and automatic starting signals operated by the closing of all the doors in a train. Now the neck of the bottle is the stretch of track between Ninety-sixth Street and 110th Street on the Lenox Avenue division. There are no stations between these points, but several curves require slow-speed running, and the capacity of this section is taxed to the utmost. As the Broadway trains are alternated with Lenox Avenue trains no more trains of the former division can be operated as long as the capacity of the latter division is limited beyond the Ninety-sixth Street junction. Speed-control signals are now being installed on the congested section in the expectation of crowding through perhaps one or two more trains an hour. Little did the builders of the subway think that a long stretch of track on one division beyond the four-track section would ever limit the capacity of the entire system.

THE WEIGHT OF STEEL CARS

The possibility that the use of steel can still further reduce the weights of street car bodies by the employment of pressed and structural steel in car construction is attracting the attention of many designers who for a long time held to the theory that, pound for pound, wood was stronger and stiffer than steel when properly framed into a complex structure, such as a car body. The first attempts at building all-steel passenger cars did not go far toward disproving this theory, but recent developments in the art of pressing and bending steel plates and rolled sections into almost every conceivable shape have made possible the use of many novel forms of construction having great strength and extremely light weight. Wood is an uncertain material as regards strength, and hence when it is used a large factor of safety must be employed. Designers have been guided in selecting sizes and shapes of timber for the principal members of the car-body framing more by the results of experience with the cut-and-try method than by exact mathematical calculations of strength and deflection under load. The formulas which enable the bridge engineer to design the details of a steel structure from a stress diagram have no place in the design of a wooden car. As the study of car design has developed, however, the stresses to which the different members are subjected under given conditions of loading have been more accurately ascertained and the application of these data to the design of steel cars should result in an appreciable decrease in the weight without sacrifice of the necessary strength or stiffness of any part.

A comparison of the weights of some recent steel cars shows how far the reduction of the weight has been carried in the latest cars as compared with those built a few years ago. The all-steel pay-as-you-enter cars of the Chicago Railways which were built in 1909 were very carefully designed with respect to the reduction of weight, and as a result they have a weight substantially the same as that of the wooden cars of the same general design and dimensions, of which the Chicago Railways have more than 600 in service. The body weight is 19,800 lb., and the cars have the following unit weights: Weight of body per seat, 494 lb.; weight of body per foot of length, 403 lb.; weight of body per square foot of floor area, 46 lb. These weights may be compared with the corresponding unit weights of the bodies of the Third Avenue Railroad's semi-convertible cars, which are of extremely light-weight wooden construction. The respective unit weights of the Third Avenue cars are 337 lb., 376 lb., and 43.5 lb. It will be seen that the wooden cars of the Third Avenue Railroad are much lighter than the steel cars of the Chicago Railways when compared on any one of the three bases of unit weight.

The type of semi-steel cars built last year for the Pittsburgh Railways is much lighter than the Chicago steel cars. The entire body below the windows is built of steel, while the roof and interior trim are wood. Owing to the elimination of the front platform and the utilization of this part of the car-body floor for seating passengers, the Pittsburgh cars have an exceptionally large seating capacity for their length and weight. The weight of the body per seat is only 315 lb., or 22 lb. less than the Third Avenue cars. The weight per foot of length is 385 lb., which is slightly more than the Third Avenue cars. The weight per square foot of floor area, however, is even higher than that of the Chicago steel cars, being 46 lb. This is due to the fact that a large part of the total floor area which is

represented is occupied by seats instead of by platforms.

The lightest steel car bodies of which we have data of weights and dimensions are the new pay-as-you-enter cars of the Jacksonville Electric Company. Only a small amount of wood is used in these cars, and it is employed for such structurally unimportant purposes as the flooring, seat-arm caps, door and window frames, etc. The bodies are 39 ft. 6½ in. long over platforms and weigh only 12,179 lb. The weight of the body per seat is 276 lb.; weight per foot of length, 308 lb.; weight per square foot of floor area, 35.4 lb. These weights are 20 per cent less than the corresponding weights of the Third Avenue Railroad wooden cars. They were obtained largely by the use of very light T-sections for one-piece posts and curved carlines, the substitution of sheets of composition board covered with canvas on the outside and painted on the inside in place of steel roof sheets, and several other radical departures from previous practice. Time alone will show whether the reduction in weight has been made at the expense of cost of maintenance.

Perhaps the best example of the reduction of weight in steel cars of successive designs is shown in the subway cars of the Interborough Rapid Transit Company. The bodies of the first steel cars, built in 1904, weighed 34,000 lb. This was reduced to 32,000 lb. in the 1907 type cars and was still further reduced to 28,540 lb. in the 1909 type cars. The body weight of the 1909 type cars compares favorably with the weight of wooden interurban car bodies of equal or greater length. The weight per foot of length is only 557 lb. and the weight per square foot of floor area is 65.7 lb. A typical high-speed interurban car body built almost entirely of wood weighs 710 lb. per foot of length and 78 lb. per square foot of floor area.

The above comparisons show that steel car bodies do not necessarily weigh more than wooden car bodies of the same size and type. The question of weight, however, is not the only factor to be considered. The first cost of steel cars at the present time is in most instances higher than that of wooden cars owing to the expensive dies and templets required for pressing and punching the various members of the framing. The maintenance cost of steel passenger car bodies has not yet been definitely established, and in a shop not properly equipped to handle repairs of steel cars the cost might be excessive.

Another problem which is a serious one in the operation of steel cars is the difficulty of insulating them against the transfer of heat from the inside to the outside during cold weather. Owing to the narrow over-all width permissible in cars operated on city streets, no width can be sacrificed on the inside of the car for dead-air spaces, or even for a moderate thickness of insulating material. In some recent steel suburban cars it was found necessary to install 68 electric heaters in each car in order to maintain a comfortable temperature. In spite of these objections the steel car seems to be destined to come more and more into general use. The Pullman Company, the Pennsylvania Railroad and several other large steam railroad systems have definitely abandoned the wooden car in favor of the all-steel car, principally because of the greater safety of the latter in collisions. Safety is not such an important consideration in the construction of cars for city service, because of their comparatively low speed, but it nevertheless is of sufficient importance to turn the balance in favor of the steel car if the first cost can be kept down, and experience shows that the maintenance cost, including painting, is at least no higher than that of wooden cars.

ELEVATED RAILWAYS AND SUBWAYS

The elevated railway reached the height of its popularity in this country about ten years ago. At that time there were about 340 miles of elevated track in the United States, all operated by electricity. Over half of this was in New York and Brooklyn. The remainder was divided among Chicago, Baltimore, Boston, Kansas City and Jersey City. The most important elevated structures built during the last decade have been those in Philadelphia and the elevated extensions of the Interborough Rapid Transit Company in New York and of the Long Island Railroad in Brooklyn. In all three of these cases the elevated lines were built simply as extensions to subway systems. It seems worth while at this time, when subways are being seriously projected, not only by the largest cities but also in such places as Cleveland, Toronto and Los Angeles, to consider the relative advantages from an operating standpoint of both elevated and subway systems.

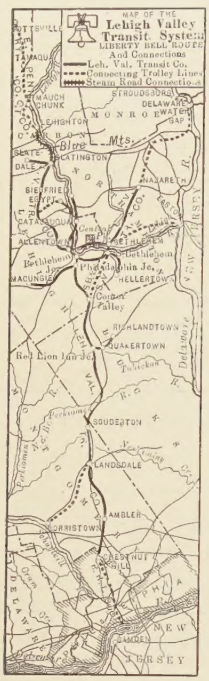
Since the opening of the Boston and New York subways little has been heard of elevated structures. Undoubtedly this is largely because the most conspicuous work of a rapid transit character in the largest cities recently has been underground. But in situations which would often warrant the construction of an elevated structure a subway at four to five times the expense would be out of the question. Again, at the same ratio of cost, from four to five times as many miles of elevated track can be built as would be the case if the tracks were underground. At the same time an elevated structure will afford practically every advantage from a traffic standpoint possessed by a subway and will in addition provide much more agreeable and practically as rapid transit for passengers.

The two principal objections to an elevated system, as compared with a subway, are its appearance on the street and the fact that owners of abutting property can collect damages for noise and the deprivation of light and air. Both of these objections are based largely upon existing elevated structures, and we believe that the objections to the appearance and the noise of elevated railways would disappear in large measure with a modern design of structure. The actual damage suffered by the abutting property from loss of light depends very largely upon the width of the street on which the elevated road is built. If the road is the property of a private company and the courts construe the common law strictly, the expense from property damages of various sorts may be, and in some cases has been, almost as much as the cost of the construction of the road itself. Even then, however, an elevated road is much cheaper than a subway, which also is liable to some damages because of encroachment upon underground vaults. But we believe that it will be possible by proper design largely to reduce these consequential damages.

In other words, we believe that the day of elevated railway construction is by no means past. For all except the very largest cities it affords a means for relieving street congestion not otherwise possible, and it should be particularly useful as providing a means by which high-speed suburban cars can enter a city without undue delay from street traffic. In fact, the elevated road should prove desirable in practically every case where a subway is considered except in those instances where the extent of traffic is such as to require a four-track line. In such cases a subway would probably be preferable to an elevated road.

IMPROVEMENTS ON THE LEHIGH VALLEY TRANSIT SYSTEM

During the past year (1910) the Lehigh Valley Transit Company, Allentown, Pa., under R. P. Stevens, president, has instituted a number of physical and operating improvements and important changes in the organization. The following paragraphs will describe in detail the work which has been done or which is now under way in each department.



Map of System

TRACK LINE, DISPATCHING AND SIGNALS

The 50-lb. and 55-lb. T-rails, which were the former standard on suburban lines, have been replaced by rails weighing 80 lb. per yard, which weight will be the future standard for suburban construction. Continuous joints have been adopted for these rails, and the entire system has been rebonded with the electric-weld rail bond of the Electric Railway Improvement Company, Cleveland. The company is permitted, and, in fact, in some cases is ordered, to use T-rails in the streets of certain cities. It therefore uses T-rail paving in those cities where paving is required and where the street traffic is not exceptionally heavy or severe. Such rails weigh 90 lb. per yard; the groove is formed by special beveled blocks. Allentown is the only city on the system where girder rails are installed. Another general track improvement has been the installation of solid manganese special work to replace manganese center construction.

These changes have had an excellent effect on the traffic of the company. On the 21-mile line from Allentown to Slatington, for instance, the receipts have risen 33 1/3 per cent, due primarily to eliminating a number of curves and grades and otherwise improving the track structure. The increased business is carried on two cars instead of three because the running time was reduced from one and a half hours to one hour. The increase in the business of this line will warrant half-hour service in a very short time.

The management has been giving a great deal of thought to securing the best possible signal equipment. It has now installed two trial equipments of the Nachod trolley contact block signal. Should this device prove satisfactory, it will be installed to protect all curves which cannot be eliminated at reasonable expense. The company is also investigating the standard steam road block signals manufactured by the Union Switch & Signal Company and the General Railway Signal Company. Propositions from these companies are now being considered and it is quite probable that an experimental outfit of either one of these signals will be tried out.

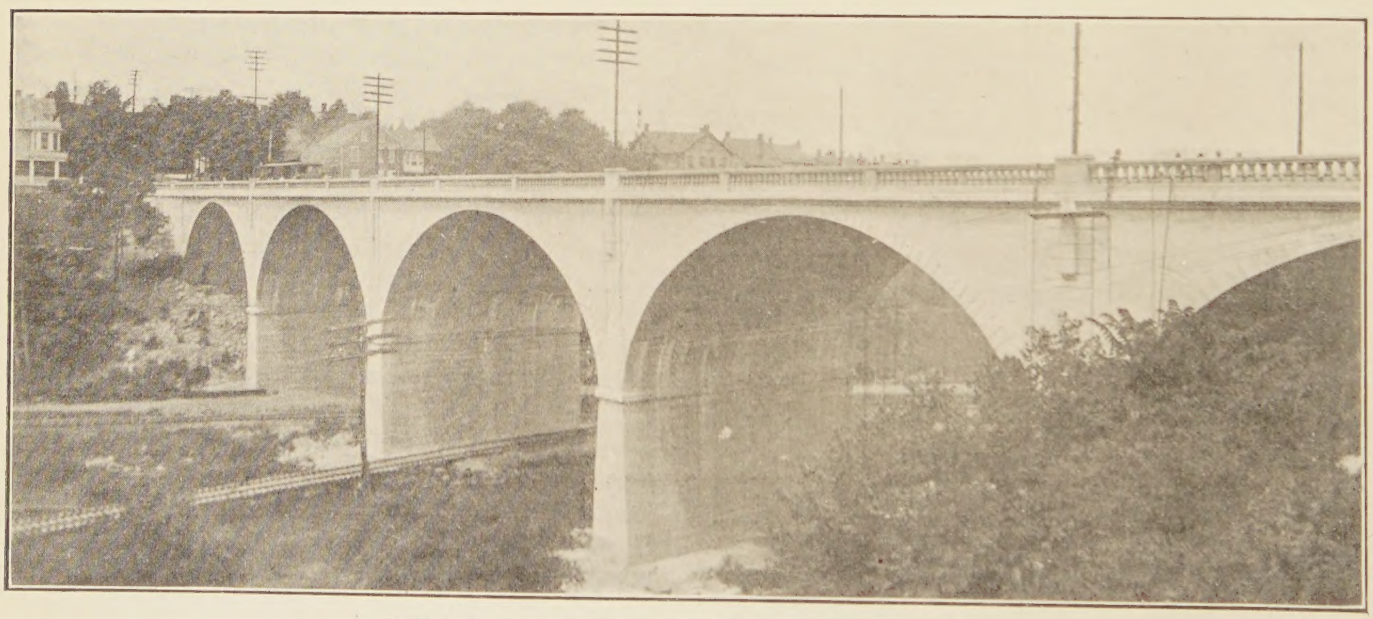
Isolated curves will be equipped with individual signals, but only one signal will be needed for the protection of several curves in proximity.

A feature which is contributing greatly to the safety and dispatching facilities of this railway is the installation of Western Electric telephone outfits on the cars of the Philadelphia and Slatington lines. Wires from the car boxes are plugged into jack boxes which are placed on the line poles at convenient intervals. The railway's contract with the Bell Telephone Companies in this vicinity permits connection to be made not only to the local system but also to the long-distance service. Consequently a person on one of these cars has the same telephoning facilities as if he were at a regular Bell telephone. This arrangement has proved a great convenience to the officers of the company when they wished to communicate with employees or others on parts of the system which could not be reached by the limited private telephone. Another favorable feature of this contract is that the telephone company maintains all instruments and the wires inside of the city limits, while the railway maintains only the lines outside of the city and has nothing whatever to do with the maintenance of the instruments.

POWER CONDITIONS

The industries of the territory served by the Lehigh Valley Transit Company have been growing so rapidly that the company has already found it necessary to increase its power station equipment, despite the fact that it completed but recently the power station described in the Electric Railway Journal of July 30, 1910. This growth in power business is not due so much to the normal increase in the railway load as to the demand from the numerous silk mills and tobacco factories in this vicinity. The additional equipment which has been ordered includes a Westinghouse turbine, rated at 4500 kw, but capable of a continuous maximum output of 6800 kw. At the lower rating this turbine will take 16.2 lb. of steam per kw-hour. With this turbine there will be installed a Le Blanc condenser, B. & W. boilers, Roney stokers; also a set of Venturi meters for accurately measuring the amount of water evaporated per pound of coal.

The load on the station has increased so that the feed-water pumps are working at their capacity. Instead of installing additional feed-water pumps of the plunger type, it was decided



Lehigh Valley Transit—Concrete Bridge at Bethlehem

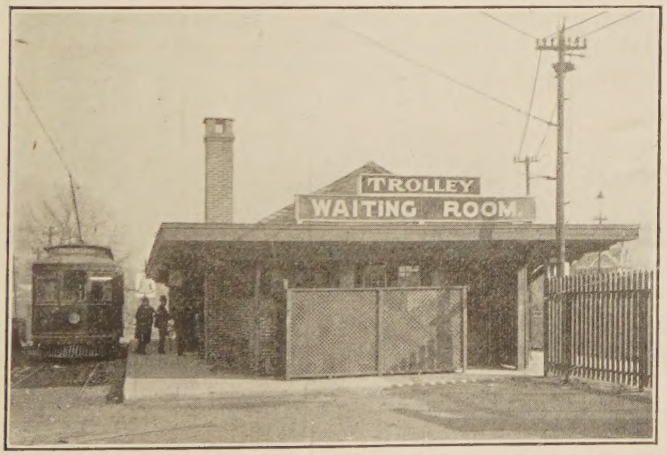
to use centrifugal pumps, manufactured by the Jeanesville Pump Works and driven by Terry steam turbines, on account of the increased economy obtained by this form of pump over the ordinary plunger pump; the other auxiliary apparatus provides plenty of steam for feed-water purposes.

As noted in the general description of the power station previously mentioned, the company is obliged to maintain 25-cycle and 60-cycle distributing systems. This, of course, makes it impossible to obtain the maximum output from the machinery, so that separate reserve equipments must be available. The railway substations receive three-phase current at 25 cycles, 13,200 volts, but a 60-cycle circuit is employed for the lighting and industrial circuits. The rates charged by the company for power are very reasonable. The standard rates quote power as low as 2.4 cents per kw-hour, but the company has special power rates considerably below this for special customers, depending on the amount of power required and the load conditions. In other instances the contract calls for a fixed sum per kilowatt connected plus so much per kw-hour, as shown by the wattmeter.

ROLLING STOCK

Last summer the company purchased from The J. G. Brill Company 10 convertible cars of the type shown in the accompanying illustrations. These cars will be the company's standard, except for high-speed service. They are similar in construction to the convertible prepayment cars of the Third Avenue Railroad, New York, except that the panels are not secured with clips, but have malleable iron strips such as are used on the No. 4000 type convertible cars of the Brooklyn Rapid Transit System. In all there are nine removable panels on each side of the car, reaching from the top of the sill plate to the letter board. There are also two fixed panels of steel at the corners of the car. All panel sash are of French plate glass, which not only looks better than the usual window glass, but is really cheaper in the long run because of its lower breakage factor.

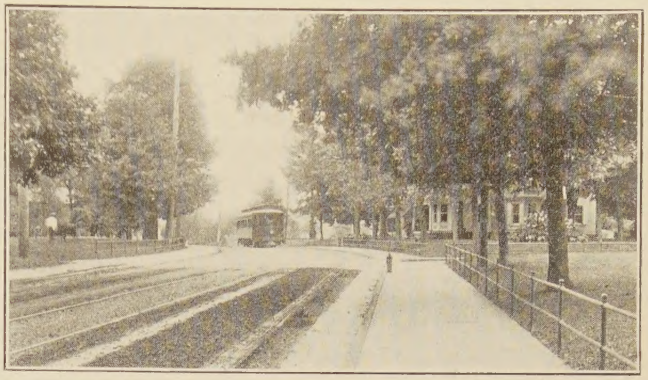
In planning these cars the management desired to obtain a design which would be as attractive as a summer car without having the drawback of a running board. In part, this end was attained by the substitution for the panels of sectional screens which are placed between the posts and which extend from the top of the sill plate to a height of 44 in. from the floor. However, the feature which actually has led the public to prefer this type to the ordinary open-bench car is the door arrangement. The two doors in the end bulkhead slide alongside each other toward the center of the car, so that with the doors open



Lehigh Valley Transit—Waiting Room at the Philadelphia Terminal

and the vestibule sash down a draft of air passes directly over each line of transverse seats.

The cars are double-ended and have full vestibules with the standard pay-as-you-enter arrangements. Four-section folding doors are provided on the controller side of the car, and a single sliding door on the brake shaft or exit side. When the folding doors are closed a pipe which is pivoted on the doors extends across them and latches to the corner post. When the doors are opened the pipe is held vertically behind the door. The sliding exit door enters a pocket, which has a hinged window on the inside for easy access to the door mechanism and for cleaning the outside windows. Primarily, this prepayment design was adopted for the value of its operating and alighting features.



Lehigh Valley Transit—A View in Coopersburg

The passengers are being educated in the use of the front platform for exit, but the management has no early intention to use the prepayment fare system, on account of the fact that practically all of its lines are at least two-fare lines, or, in other words, have more than one collection. The city service in the different cities is made up almost entirely of suburban and interurban cars running through city streets, and because of the fact that the company would not get as much benefit from the prepayment features on this account as it would if the cars were all operated with one collection, the management has decided to wait until these pay-as-you-enter features are more developed before any decision is reached as to which method will be adopted.

The general dimensions and other statistical data of these cars are as follows:

Length of car body over the corner posts	20 ft. 1 in.
Length of each platform	5 ft. 10 in.
Length of the car over the vestibules	41 ft. 9 in.
Length over the bumpers	43 ft. 1 in.
Width over the sills, including plates	8 ft. 8 in.
Width over the posts	8 ft. 8 in.
Weight of the car and trucks, including Westinghouse air brakes, four 101-B motors	49,420 lb.

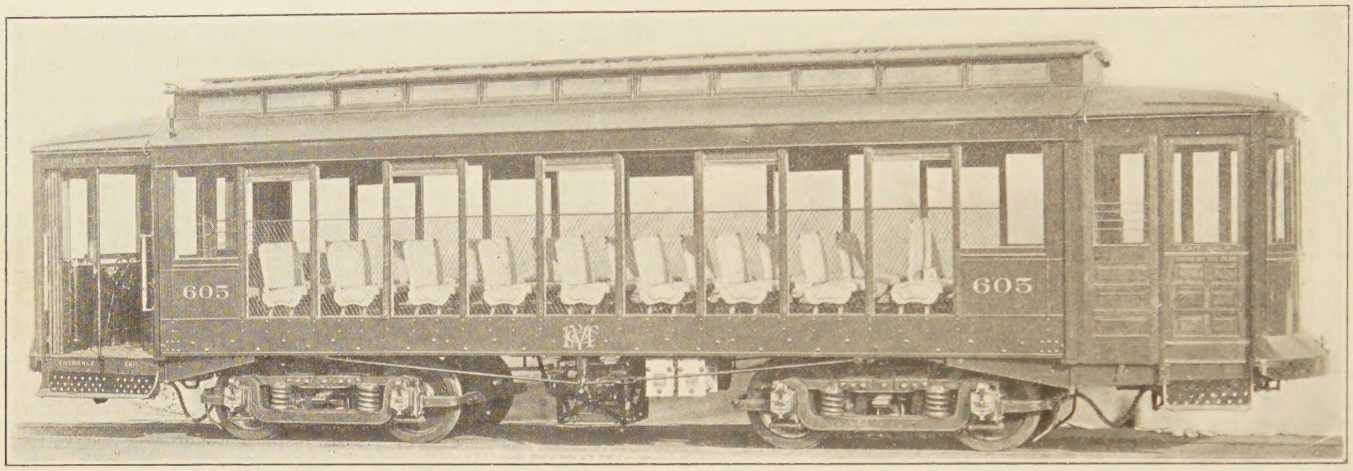
There are nine reversible rattan seats on each side of the car and longitudinal seats at the front corner, giving a total seating capacity of 44 persons. As a part of the removal panel construction the side sills, which are 4½ in. x 7 in. long-leaf yellow pine, are covered with 14-in. x 9/16-in. steel plate, extending above the level of the floor. The trucks are of the Brill No. 27 M. C. B. type, with 6-ft. wheelbase, 34-in. rolled-steel wheels, with 3-in. thread and ¾-in. flange. The axles are 5 in. in diameter and the journal 4¾ in. x 8 in.

The interior finish of the cars is cherry with composition ceiling. A Consolidated push-button passenger signal system is installed to facilitate operation. Another interesting feature of these cars is the lighting by tantalum lamps. These lamps are being used experimentally only, as the company's low power cost makes the use of the more expensive high-efficiency lamp of doubtful economy.

These cars are equipped with the Cooper Heater Company's improved pressed-steel, automatic-feed, hot-water heaters. These heaters are very much lighter than the previous styles of heaters manufactured by this company. It has been demonstrated that in addition to the saving in weight the advantages of the automatic feed of the coal, the little space which the heater takes up and a few minor improvements over the former Cooper heater result in a fuel consumption which is but a little over one-half of that required by the other type of heaters to give the same amount of heat.

The company has made adequate preparation for snow fighting by equipping its work and freight cars with Russell plows

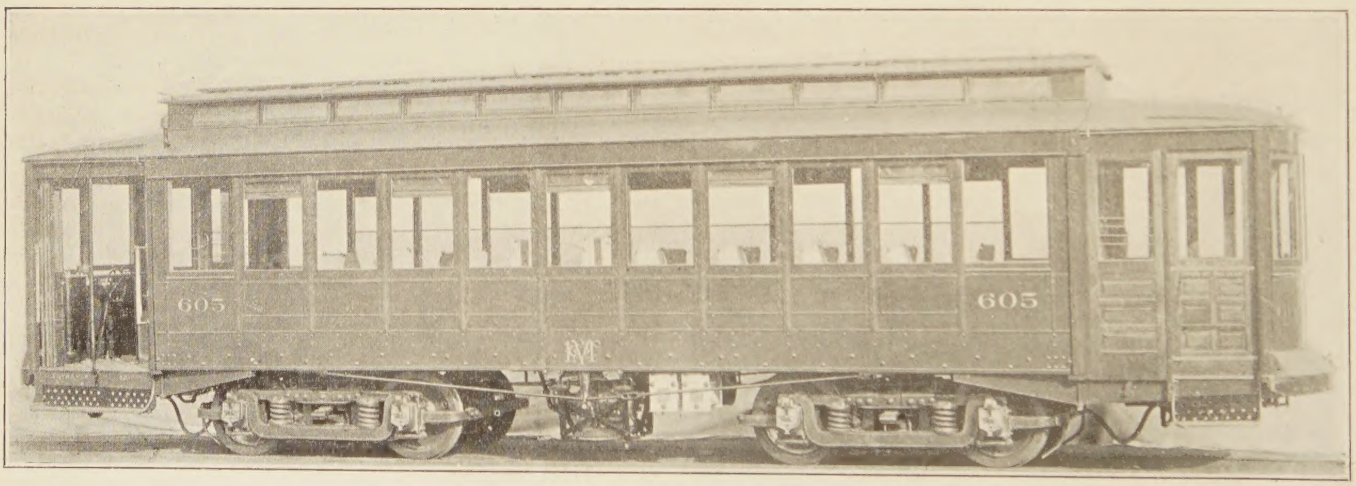
and Root scrapers and purchasing five Kuhlman long-broom sweepers, which have just been completed by The J. G. Brill Company. Each sweeper is 27 ft. 8 in. long and 8 ft. wide over all. The cab is 24 ft. 1¾ in. long and 7 ft. 8¼ in. wide. The cab is vestibuled at each end and has two sliding doors and five windows on each side. The center doors are carried on baggage-door hangers. The height from the rail to the top of the platform is 4 ft. 4⅜ in. and to the top of the trolley board 11 ft. 1¼ in. The framing of the sweeper is of yellow pine with side sills plated with ⅝-in. x 8-in. steel. The truck has a wheel-



Lehigh Valley Transit—Standard Convertible Car as Used in Warm Weather

base of 6 ft. 7 in. The brooms are 35½ in. in diameter, extending 14 in. outside of the track. The two side plows, which are thoroughly braced, are 6 ft. long and are made of ¼-in. steel. These plows are 24 in. high and clear the snow for 4 ft. outside of the rail. Two Westinghouse No. 56 motors are used for traction and one motor of the same type for operating the broom.

The company has also adopted a combination express car and snow plow for its standard type of heavy equipment. The large double-truck express cars in addition to the work cars are all equipped with the standard Russell nose and in this way it is possible to get 12 months of the year service out of



Lehigh Valley Transit—Standard Convertible Car as Used in Cold Weather

these cars. The company now has six of these heavy cars, each equipped with No. 121-A 90-hp motors, in addition to 10 of the older type of Brill and Taunton single-truck plows.

MAINTENANCE FEATURES

At present the company is handicapped in maintaining its cars owing to outgrown shop facilities, but eventually a larger structure will be built on another site. To afford immediate relief, however, the paint shop has been removed to a new brick and concrete building, thus giving room for a larger carpentry shop. The latter is being equipped with modern woodworking tools, such as a car mortiser, planer, saws, shaper, lathe and a "Universal" Fay & Egan machine, all of which will be belt-driven from below the floor. The machine shop equipment has recently been enlarged by the addition of a McCabe two-in-one lathe, which handles all steel wheel turning besides a variety of general work. The overhauling facilities are also to be improved by the installation of Q M S pneumatic car-raising apparatus and a car-hoisting outfit from the Columbia Machine Works & Malleable Iron Company.

As noted in the description of the new cars the standard truck for suburban service is the Brill No. 27 M.C.B.-1. The standard high-speed passenger trucks are of Baldwin design. Symington journal boxes are used throughout on all class of trucks. Schoen and Standard solid steel wheels 34 in. in diameter are replacing the 33-in. cast-iron wheels formerly used on all closed cars. The standard brake shoe head of the American Brake Shoe & Foundry Company has been adopted as standard, and all brake shoes, a half-dozen different types of which have been tried out during the past year, have been made to fit this head. These shoes are either of the steel-back type as used successfully on the solid steel wheels of the Philadelphia-Allentown cars or of plain gray iron. The brake shoe cost for September, 1910, was 1.2 cents per 1000 car miles. Three-fourths of the shoes used during that month were gray iron and the rest were steel-backed.

ORGANIZATION OF THE TRAFFIC DEPARTMENT

An important departure in the organization of the Lehigh Valley Transit Company has been the recent founding of a traffic department. Under the direction of President Stevens this department has been taken over by E. C. Spring, who was formerly general superintendent of the Dayton (Ohio), Covington & Piqua Traction Company. As assistant to the presi-

dent and as traffic manager Mr. Spring's work includes the handling of passenger and excursion business, park operation, freight and express service, the industrial department and publicity covering the relations with press and public.

The creation of an industrial department is rather unusual for Eastern electric railways, although such an organization is quite common on steam railroads and on some of the Western interurban railways. The efforts of this department will be devoted to inducing manufacturers to locate their industries along the lines of the company. The traffic manager will keep a list of all manufacturing sites which are available for building or for rental, and will strive to bring together the sellers and buyers of such facilities, co-operating in particular with the local boards of trade. The company has already persuaded several manufacturers to locate buildings along its lines.

The Allentown district is unfamiliar with the advantages of electric freight hauling, but it is believed that the possibilities for business therein are even better than on many Western roads because the proximity of the towns to one another should give a greater revenue per car-mile. Express service in competition with the steam railroads and the old line express companies is given for shipments, which are handled at the rates given in regular freight classifications. While no carload lots are taken, nor is a wagon service maintained, the company is willing to make special arrangements for collection and delivery through local truckmen. The rates from Allentown to Philadelphia, a distance of 52 miles, range from 16 cents to 25 cents per 100 lb.

An agreement has been closed with the Philadelphia Rapid Transit Company to carry goods to the latter's freight terminal at Front and Market Streets in the heart of Philadelphia via express car connections at Chestnut Hill. The Lehigh Valley Transit Company has made a list of all Philadelphia concerns which ship to towns along its lines and is mapping out a campaign in which every single shipper will be made acquainted with the advantages of routing his goods by the electric line in preference to the steam railroad.

In line with the policy of attracting new business the company has greatly improved its schedule; the mileage of the express cars has been doubled and there are now three daily trips to Philadelphia, each car making a total run of 147 miles. The principle is to maintain a schedule so much better than that offered by competitors that it will create business.

Freight stations for the convenience of shippers are being placed in the more important cities and freight houses will be put up at isolated points where shippers can store their goods under cover. These isolated buildings will be slate-roofed wooden structures approximately 12 ft. x 12 ft. in size. Some of the town stations will be on the premises of local storekeepers. In two places the brick buildings will include rooming quarters for the agent. A freight station for transfers has been erected at Chestnut Hill, Philadelphia, because of the difference in the gage between tracks of the Lehigh Valley Transit Company and the Philadelphia Rapid Transit Company.

In its campaign for traffic the company will depend more upon advertising its service through personal work and private literature than upon newspaper advertising. The agents who will be placed in all the large towns along the line will also look out for the passenger excursion business in their respective localities. The company believes that it is a most vital thing to have local representatives everywhere to look after the details of its business. This practice saves much mileage and time for the officials while keeping them in close touch with the local freight and passenger business. It is the plan also to have the head of the traffic department give talks to the trainmen on what they can do to encourage the public to take advantage of the company's facilities, thereby making each man a publicity agent for the railway.

The traffic department will make a strong effort to get the local public interested in long distance riding. The company is rather fortunate in having on its route such exceptionally attractive trips as the one to the Delaware Water Gap and through the historic territory between Allentown and Philadelphia, which is rich in Revolutionary lore. Hitherto the public has had the impression that the Gap was accessible only by steam railroad, but by active advertising the company is inducing it to prefer the more convenient and pleasing combination of electric car and auto-bus. During next summer two or three limited trains a day will be run to the Gap. The patronage for this business will be worked up through an excursion agent in Philadelphia and by local representatives.

The long trip to Philadelphia has been aptly termed the Liberty Bell Route. The many places of historic interest along this line should prove especially attractive for school riding. The management, therefore, has placed itself in close touch with the different schools in its territory for the purpose of persuading teachers to organize excursions to different places from time to time. The company gives away a booklet which describes the points of interest along the line, but whenever desired large parties are personally conducted by its representatives. It is worth mentioning that special rates are never offered for this or other excursion business. It is considered a mistake to offer reduced rates when the service is so evidently worth the regular rates and is so far superior to that offered by competing lines.

A large number of minor improvements have also been made on the Philadelphia division, such as the establishment of smoking compartments, Ohmer registers and hot-water heaters in all these cars, a ticket system and terminal stations. A large number of line improvements have also been made by constructing the track on private right-of-way in a great many instances where it was formerly either on or alongside the highway.

The company is planning also to give more attention to the park business. It is the owner of Central Park, which is situated at Rittersville, midway between Allentown and Bethlehem. This is a resort of great natural beauty, which can be reached by a 5-cent fare from the two large cities mentioned. The principal attractions have been free band concerts, vaudeville, musical comedy and comic opera, in addition to the standard amusements, such as the midway, roller coasters, temple of fun, bowling alleys, dancing pavilions, water rides and other standard attractions. It is worthy of note that this park is not only paying operating expenses, but shows a sufficient surplus to pay for the interest on the entire investment. The real estate is increasing in value sufficiently so that the investment always represents the actual value which can be turned into cash in case the park should be eliminated.

Another new traffic-creating feature will be the encouragement of local celebrations, such as "Old Home Week." To this end the company will co-operate with the commercial and social bodies in the several towns.

SUGGESTIONS FROM EMPLOYEES

The management firmly believes in encouraging the employees to submit suggestions for the improvement of the service. Last year $100 was offered in prizes for suggestions and some exceptionally good ideas were found among the 100 replies. The conductors especially gave the management some excellent suggestions on improving the transfer system and cutting down unprofitable mileage. The transfer changes alone have more than saved the amount of the prizes. Some conductors reported that they had heard many complaints about the ventilation of the cars, particularly on long runs where the doors were closed for considerable intervals. As a result of this matter having been called to the attention of the management 20 equipments of Ford ventilators were purchased from the Automatic Ventilator Company for the equipment of the interurban cars and eventually all cars will be supplied with these devices.

Some three years ago this property was a strong union property, but the unions have all been disbanded and now the feeling against unions is very intense. The company has systematically raised wages each year. It has provided a pension system and an employees' benefit association, besides an employees' outing and picnic each year.

These methods have established a spirit of good feeling between the officials and the employees which could hardly be improved upon.

The pension and sick benefit systems were inaugurated on Jan. 1, 1911. All employees who have been in the company's service continuously for 25 years or over will receive a pension of $5 per week as long as they live. The following paragraphs will give some particulars of the benefit association.

Membership in the association is limited to employees over 18 years and under 50 years of age who have been in the service for at least three months. Membership ceases when the member leaves the employ of the company, but sick benefit payments continue under certain conditions if the resigning member is suffering from sickness incurred while in the company's employ. Employees who are dishonorably discharged immediately forfeit all association benefits. An applicant for membership must be approved by an authorized medical examiner of the association and indorsed by the superintendent or head of his department. The ordinary initiation fee is $1 plus 50 cents for the dues of the first month and a fee to the examining physician.

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LEHIGH VALLEY TRANSIT BENEFIT ASSOCIATION

NOTICE OF DISABLEMENT
AND
APPLICATION FOR SICK BENEFIT

..... 191

To the Secretary:

I, ... residing

at ..... and employed as .....

in ..... Department, and holding Certificate

No. ..... hereby certify that I was compelled to quit my

work at ..... o'clock 191

on account of .....

.....

.....

which rendered me totally unable to continue my usual duties

.....
Sick Member

Dr. .....
Attending Physician

Address .....

Referred to Secretary

.....
Head of Department

Remarks: .....

.....

.....

This blank is to be filled out by any member of the Association who is unable to perform his usual duties on account of sickness, and no claim for benefits will be considered unless this Notice, properly filled out, and approved by head of department has been received promptly by the Secretary. Full address and correct time, and nature of disability must be given.

Lehigh Valley Transit—Form for Reporting Illness

The regular dues are 50 cents a month. Special assessments must not exceed 50 cents in any one month or $3 in any one year. Members are not required to pay dues while receiving benefit payments. In case the net balance at the time of the annual meeting is over $500 any excess will be divided pro rata among the members in good standing. Sick or injured members are entitled to receive $1 for each day after the first seven days and for each period not exceeding 90 days in any one year. No payment is made on account of disability lasting less than seven consecutive days. On the death of a member the heirs receive $150.

The accompanying blank shows the procedure followed in applying for a sick benefit. The applicant's statement must be indorsed by the head of his department. If not indorsed, the latter must write his reasons on the form and transmit the report to the secretary of the association. The secretary then details the physician to examine the member in question. Payment is made only if the doctor's report is favorable. The physician also keeps the secretary advised of the progress made by sick members. Sick benefits are paid weekly and death benefits are paid within 30 days after proof of death is filed with the secretary. Advances may be made by direction of the president of the association for funeral or other urgent expenses incidental to the death of a member up to and including $60. These advances must not exceed the sum mentioned if they are made without the written consent of the person to whom the death benefit is payable.

The president (or general manager) of the Lehigh Valley Transit Company is the president of the association. The first vice-president is elected at the annual meeting by a majority vote of the members present. The treasurer of the Lehigh Valley Transit Company is always the treasurer of the association. The secretary is appointed by the board of trustees. The management of the association is vested in a board of trustees, which consists of a chairman and six members. The president is also the chairman of the board of trustees. The president of the Lehigh Valley Transit Company appoints three members of the board, one of whom is the company's treasurer, one the company's vice-president and one a representative of either the railway or the lighting department. The other two trustees are elected by a majority vote of the members present at the annual meeting. The term of office of the trustees is one year and they meet at least once a month.

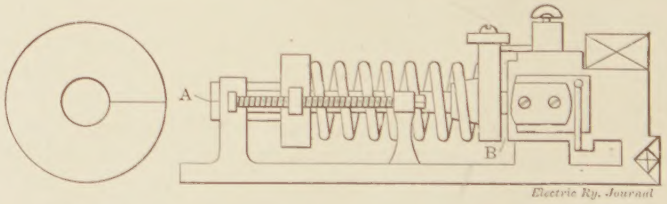
FINANCIAL

The preliminary report on the company's earnings for the year ended Nov. 30, 1910, shows a surplus of about $211,000 above all charges. The report shows considerable additions to income from the railway business and also from the sale of power, electric lighting and express business. The surplus compares with a surplus for 1909 of $101,688. The company has now doubled its surplus for each of three successive years and has followed a conservative policy of investing it in improvements.

ADJUSTING WESTINGHOUSE ELECTRIC PUMP GOVERNOR

BY GEO. H. COLEMAN

When the adjusting attachment is not used with the Westinghouse electric pump governor, type G-1-A, it is regulated with difficulty. Those using this type have found that when the governor is set to cut out at 90 lb. it will not cut in again until the air pressure has been reduced to about 68 lb., making a variation of 22 lb. When the air is thus reduced the brakes give poor service. On the magnetic type the piston is held by the magnetic coil and spring. Consequently, when the pressure against the piston is sufficient to overcome the magnet and spring the armature begins to move away from the magnet. As the power of the magnet decreases faster than the tension of the spring increases, the rate of movement of the piston and armature increases more and more rapidly until the current is



Electric Ry. Journal

Adjusting Attachment for Electric Pump Governor

broken at the contacts. Then the electromagnet loses all its power, and the entire load is thrown upon the spring. As a result the armature and circuit closer are forced away from the magnet and contacts with a quick movement.

To correct this fault use a piece of cardboard about 3 in. in diameter, with a hole cut in the center large enough to admit the shaft. Cut the cardboard as shown in illustration, so that when the armature and circuit closer are released from the magnet it can easily be placed at "*B*" without taking the governor apart. Put a little shellac on the cardboard and it will hold firmly to the armature. This will make a magnetic gap the same width as the thickness of the cardboard, so that the variation will be between 10-lb. and 15-lb. air pressure.

SNOW-FIGHTING EQUIPMENT FOR THE BROOKLYN RAPID TRANSIT SYSTEM

The mechanical department of the Brooklyn Rapid Transit System has recently completed the equipment of seven long-broom snow sweepers, six of which are of the Smith & Wallace type and one of McGuire-Cummings manufacture. These sweepers are approximately 28 ft. over all and about 7 ft. wide. The trucks are of ordinary freight design and are fitted with 4¼-in. x 8-in. M. C. B. journals arranged to take the B. R. T. standard freight car axles, which are 5-in. diameter at the motor bearings. The trucks are equipped with solid steel wheels.

These sweepers are fitted with sand spouts at each end, hand brakes with inside brake rigging, Nuttall No. 11 trolley stands and Dayton No. 8 headlights. A rather unusual feature for service cars is that all the wires are run in separate loricated conduits which have junction boxes at the place where the resistance and motor leads are taken out.

The underframing of the six sweepers is of standard structural steel shapes throughout. The side sills are of 6-in. 12¼-lb. I-beams, the cross framing of 6-in. 12¼-lb. I-beams and channels, and the diagonal bracing of 6-in. 7-lb. channels and 3-in. x 3 in. x ½-in. angle iron. The underframe is reinforced with 15-in. 33-lb. channels riveted to the same and extended beyond the pedestals. The floor of the sweeper is of 1¾-in. yellow pine. The cab, which is also framed in pine, has sliding doors at each side, one drop sash on each side and four drop sash at each end.

Fig. 2.—Brooklyn Snow-Fighting Equipment—Another Type of Sweeper

The McGuire-Cummings sweeper, shown in Fig. 2, has substantially the same equipment and dimensions as the others. Its framing is made up of 8-in. 18-lb. I-beams for the side sills; 8-in., 11¼-lb. channels for the end sills and smaller channels for the cross members, as indicated on the drawing. The extreme width of the car and brooms is 8 ft. 11 in. The truck wheelbase is 6 ft. 6 in. The overhang of the mechanism and sills is braced to the truck pedestals with piping. The broom is 32 in. in diameter and is operated by means of wrought-steel links over cast-steel sprockets which are fastened to the motor shaft and to the broom shaft. A feature of this sweeper is the flexible hanging of the brooms which is so necessary in going over uneven pavement. The brooms are journaled in slots at the center and each end so that they can be removed merely by loosening three bolts. The brooms are driven at 300 r.p.m. to 350 r.p.m. by a 60-hp motor, which is set on a journaled shaft in the center of the cab. This shaft has a clutch on each end to throw the brooms in and out of gear. The side wings are raised and lowered by an operating wheel on the cab. The diagonal end sills of this car prevent the snow from packing under the body. The general construction is such that a draft gear can be located on the end sill without interference from snow thrown off by the brooms. The underframe of this sweeper is shown in Fig. 3.

Fig. 1.—Brooklyn Snow-Fighting Equipment—One of Six Long-Broom Sweepers Ready for Service

The equipment for propelling these sweepers consists of two Westinghouse 81 60-hp motors. One motor of similar type is used for the broom drive. These brooms have the long sweep of 14 in. outside the rails. They are made up in eight segments of 5/16-in. rattan and are 36 in. in diameter when assembled. The brooms are raised and lowered at approximately 45 deg. to the track by a hand wheel located inside the cab. They can be lifted to a maximum of 3 in. above the head of the rail. The brooms are driven by means of a forged steel link roller chain operating on cast-steel sprockets. The broom motor drive leads from the motor shaft to a sprocket idler and from the sprocket idler to the broom by a separate chain. The idler sprocket is mounted on the shaft which carries the broom arms so that the raising and lowering of the brooms will not cause any difference in the slack of the driving chain. The side wings are of ⅜-in. x 22-in. x 6-ft. reinforced sheet steel. They are attached to the truck framing on each side and are set at an angle of approximately 45 deg. The wings are controlled from the cab.

TEMPORARY SNOW PLOWS

The Brooklyn Rapid Transit System owns quite a number of freight cars, some of which are idle in the winter owing to the decreased freight business during that season. It has, therefore, been found feasible to increase the snow-fighting

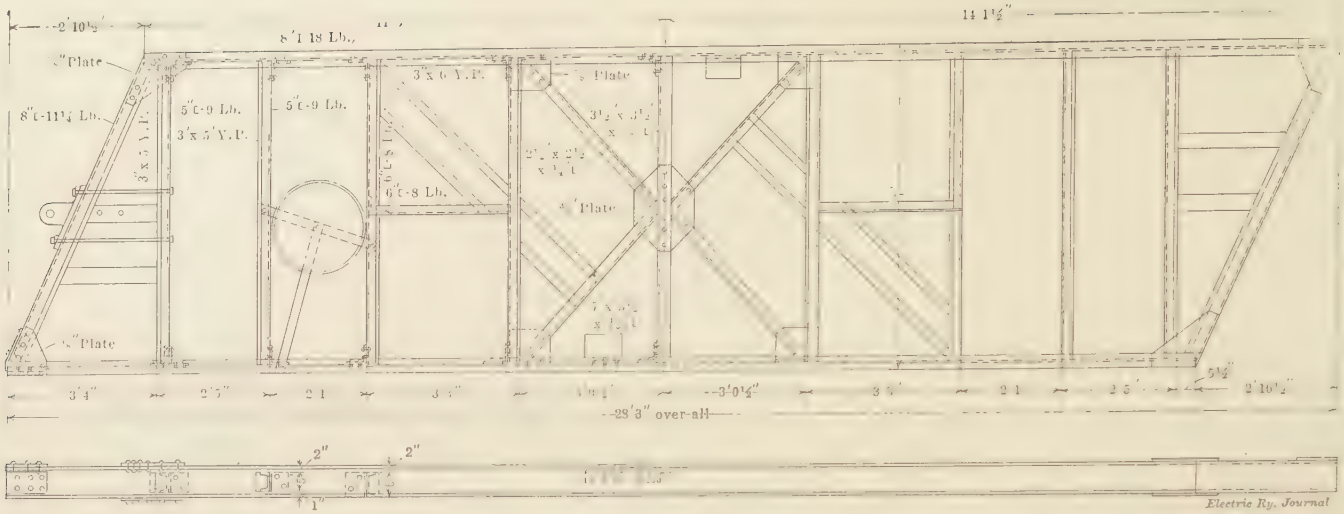


Fig. 3.—Brooklyn Snow-Fighting Equipment—Steel Underframe of One of the New Sweepers

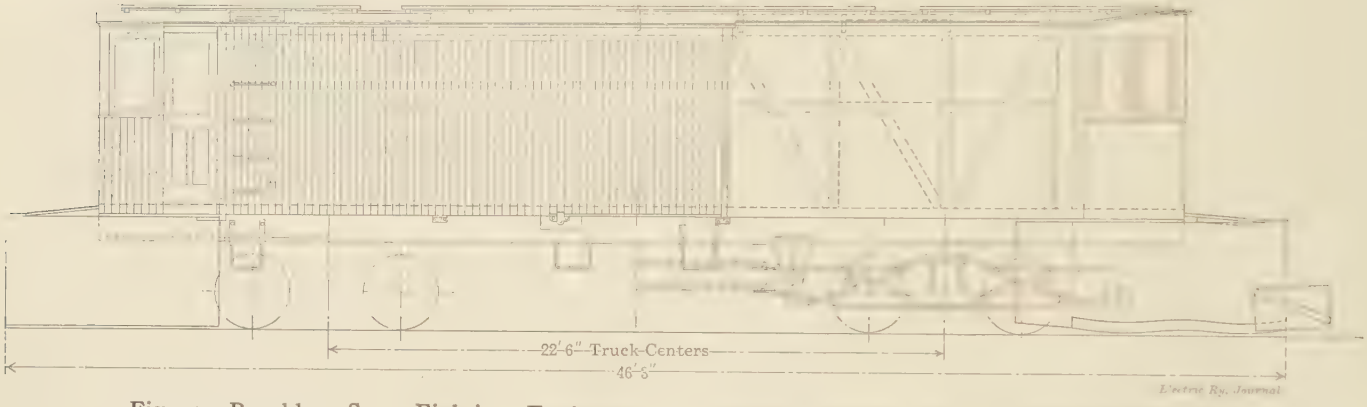


Fig. 4.—Brooklyn Snow-Fighting Equipment—Combination Surface Box Car and Snow Plow

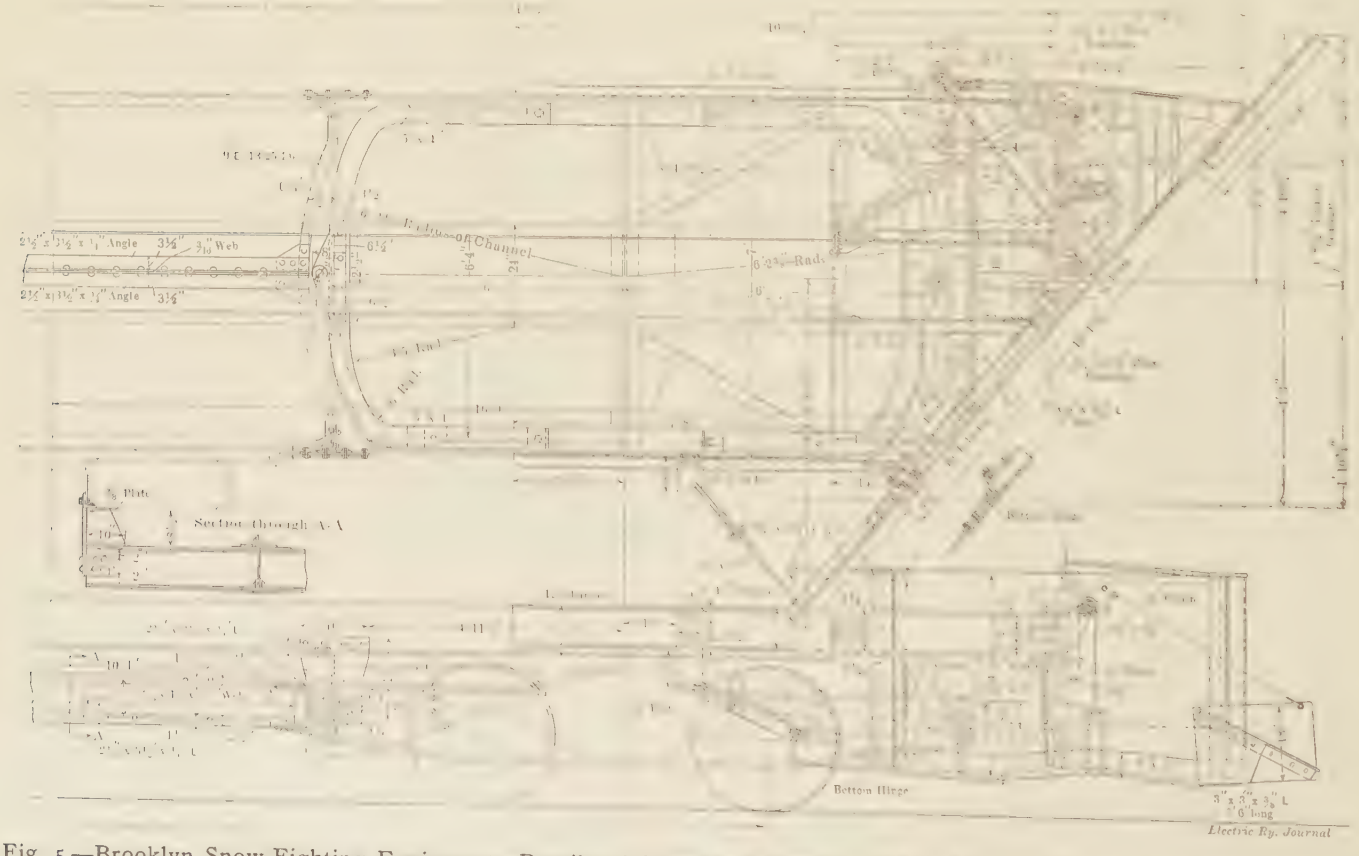


Fig. 5.—Brooklyn Snow-Fighting Equipment—Details of S hear and Framing of Combination Box Car and Snow Plow

equipment at little expense by taking two box cars and equipping them for service as temporary snow plows. The shears and lifting mechanism are operated with air like the company's large pneumatic plows, but hand operation for emergencies is also provided. These box car plows were built up from two steel gondola cars. The snow-fighting equipment is removed in the spring to permit these cars to be employed for freight service.

The original gondolas had very light platforms and were without a vestibule. In order to fit them for snow-plow service the platforms were removed entirely and a 10-in. 15-lb. channel iron was attached to each side of the sill for a distance of 26 in. back of the bolsters and extending outward far enough for a platform and vestibule to carry the plow nosings as well as the lifting apparatus placed inside the cab. A roller was placed on each truck with a radial casting on each nosing, and between the two trucks a girder was installed with a 9-in. channel bent to the radius of the truck swing. This construction will carry the thrust from one truck to the other without going through the center plates or the king pins. The plow nosings are arranged to rise about 10 in.

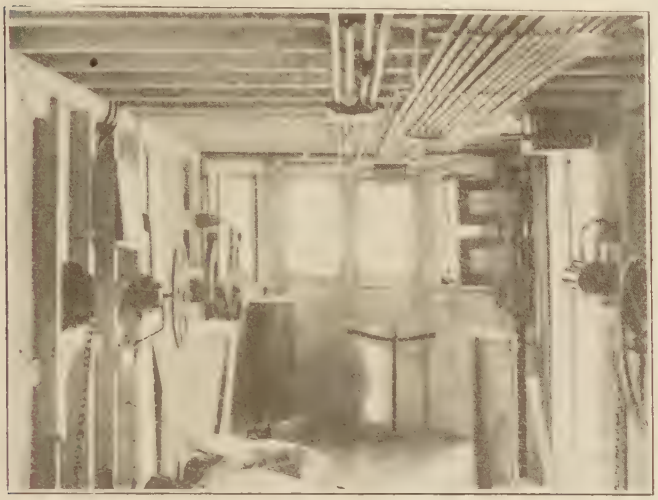


Fig. 6.—Brooklyn Snow-Fighting Equipment—Interior of Sweeper, Showing Arrangement of Apparatus and Conduit Wiring

PROPOSED SHUTTLE SYSTEM OF CHICAGO SUBWAYS

In a paper read before the Western Society of Engineers on Feb. 8, 1911, A. S. Robinson outlined a proposed subway system to relieve the congestion of surface cars on the streets within the Loop district. The essential feature of Mr. Robinson's plan was the through routing of cars from north to south and looping of cars to and from the west side. Four separate north and south routes were proposed and four separate loop routes from the west side. The subways would be built close to the surface of the streets and at intersections the west side loop routes would be carried under the north and south subways. The plan also contemplated a crosstown transfer subway at a lower level, intersecting all routes so as to avoid the necessity of providing means for transferring at each separate intersection of the through routes. A total of 18 miles of subways would be required for the complete system. When the width of the street would permit, three or even four tracks would be built and the cross-section of the tunnels would be large enough to accommodate elevated cars as well as surface cars. One feature of Mr. Robinson's plan on which he laid great stress was that it would permit the construction of the subways as independent sections or units which could be used immediately after they were completed with corresponding relief to the streets now occupied by the lines which would be diverted into them. Mr. Robinson estimated that cost per mile for double-track subways, not including rolling stock, would be $2,513,000, or a total of nearly $45,000,000 for the complete system.

THE ARNOLD PITTSBURGH REPORT

The complete report of Bion J. Arnold on the Pittsburgh transportation problem was submitted to Mayor Magee, of Pittsburgh, this week. It is contained in a volume of over 200 pages with a large number of diagrams and other illustrations. Portions of this report which were made public before the completion of the entire report were published in the ELECTRIC RAILWAY JOURNAL for July 23, July 30, Aug. 13 and Aug. 20, 1910.

INTRODUCTORY

The report begins with a copy of a letter of authorization from Mayor Magee to Mr. Arnold to take up the subject of the transit situation in Pittsburgh. Mr. Magee stated that the city was about to enter upon a new era of physical improvement and was planning to widen, extend and alter the grade of streets at congested points in the business district, to eliminate steam railway grade crossings, to regulate vehicle traffic on streets, etc., and desired to know "what new rapid transit facilities we need and to what extent capital would be justified in making this investment and what technical and financial limitations may exist in the promotion of subways, elevated roads and electrified steam roads, etc."

In the introduction to his report Mr. Arnold stated that he had confined himself almost entirely to the surface railway system in Pittsburgh because, in his opinion, the city's immediate transit needs can and should be supplied mainly by the present street railway system, although Mr. Arnold adds a preliminary report on rapid transit in connection with the discussion of future developments. He said he did not attempt to show in detail either the corporate history of the interrelationships between the various underlined companies forming the system or the distribution of the fixed charges, nor would he attempt to determine whether the fixed charges were excessive either in whole or in part. He believes that this would require an appraisal of the existing physical property, but this Mr. Arnold did not advise at the present time. He shows, however, comparative records of the Pittsburgh system with traction systems in nearly all of the large American cities. In his introduction he also emphasizes the benefits of having one operating system for the entire district and acknowledges the co-operation of Mr. Callery and other officers of the Pittsburgh Railways Company in supplying information.

IMMEDIATE NEEDS

After a discussion of the immediate needs of transportation in the Pittsburgh district, which had been discussed in previous reports by the State Railroad Commission and others, the difficulties to be overcome, the general direction in which improvements must be made in the opinion of Mr. Arnold and a general discussion of the transportation problem, as abstracted in the ELECTRIC RAILWAY JOURNAL for Aug. 13, 1910, Mr. Arnold gives a history of surface traction in Pittsburgh.

As a basis for a permanent settlement, he states certain considerations which he considers are fundamental in reaching a satisfactory conclusion. The first of these is that the company "should be assured on the basis of an agreed rate of return on the actual present value of the property (cost to reproduce minus depreciation); this value to be determined by an appraisal of the present physical property, to which should be added an agreed allowance for development expenses. A fair return should also be allowed upon all money spent upon the property to rehabilitate it and put it in first-class operating condition so as to give adequate service, as well as on all moneys spent on extensions and improvements."

The second consideration is that the "properties to be rehabilitated and maintained up to an average operating condition equal to at least 70 per cent of its cost to reproduce new, all future maintenance to be paid for out of operating expenses and renewals to be made out of the earnings of the property."

The system should also have the benefit of the latest improvement in the arts, so as to be kept up to date, and the service to be supplied should preferably be measured in a percentage of

the income so that the greater the yearly income the better will be the service.

Mr. Arnold also believes in re-routing, not only to eliminate useless car miles, but to reduce transferring. Transfers, he thinks, should be provided so that a continuous single ride can be secured in one general direction with at least one free transfer.

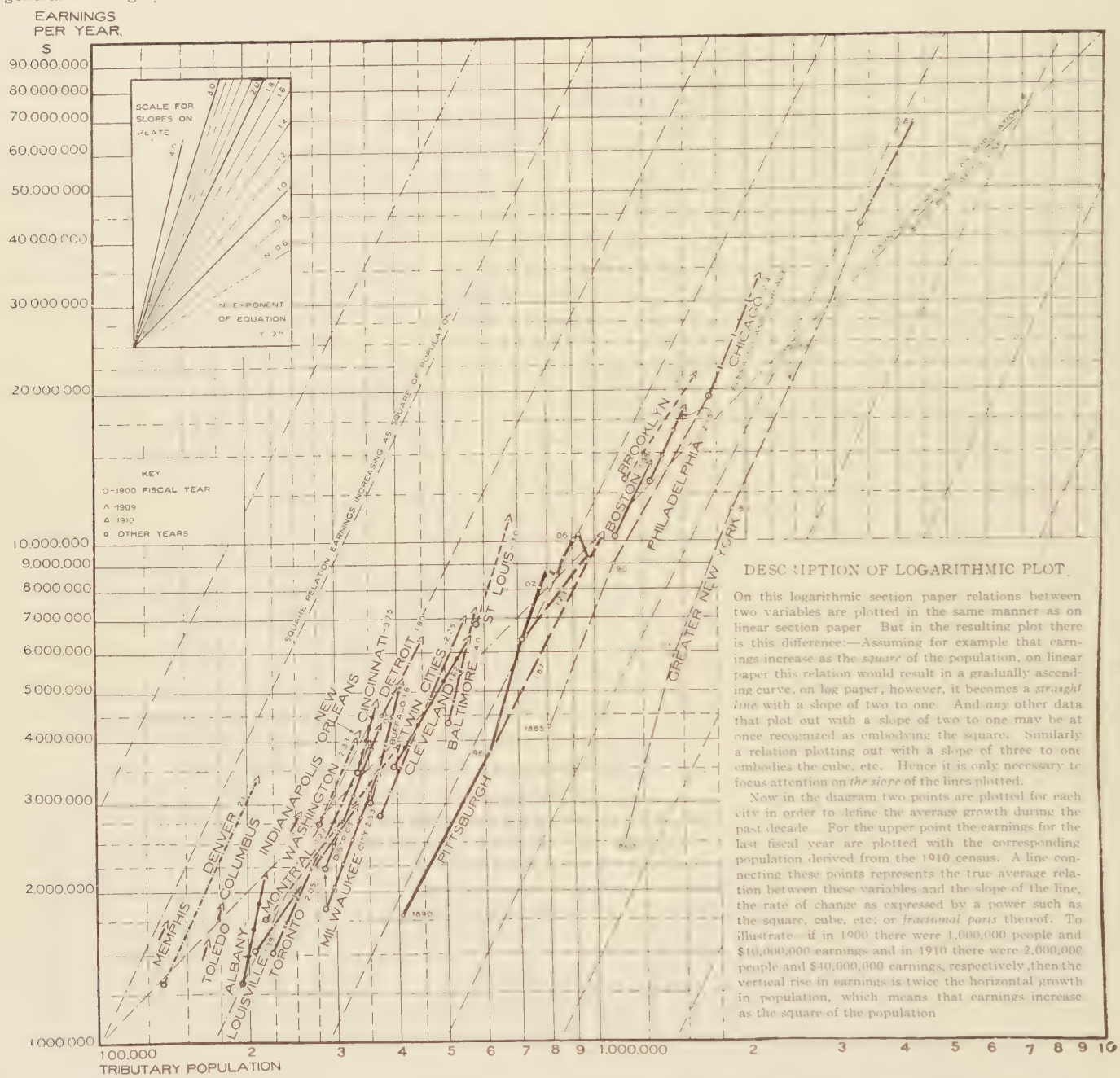
All of the technical details, expenditures of money on property, methods of operation, standardization of accounts and general auditing of books "should be under the supervision of some board (upon which both the city and the company might be represented) empowered with authority to initiate reasonable improvements, control operation and cause its acts to be enforced. The records of this body should be open to the public."

Finally he thinks that "the new agreement should be in the form of an indeterminate permit or franchise which can be terminated by the city at any time upon the payment of a fair compensation for the value of the property, exclusive of franchise values."

FUTURE TRANSIT DEVELOPMENT

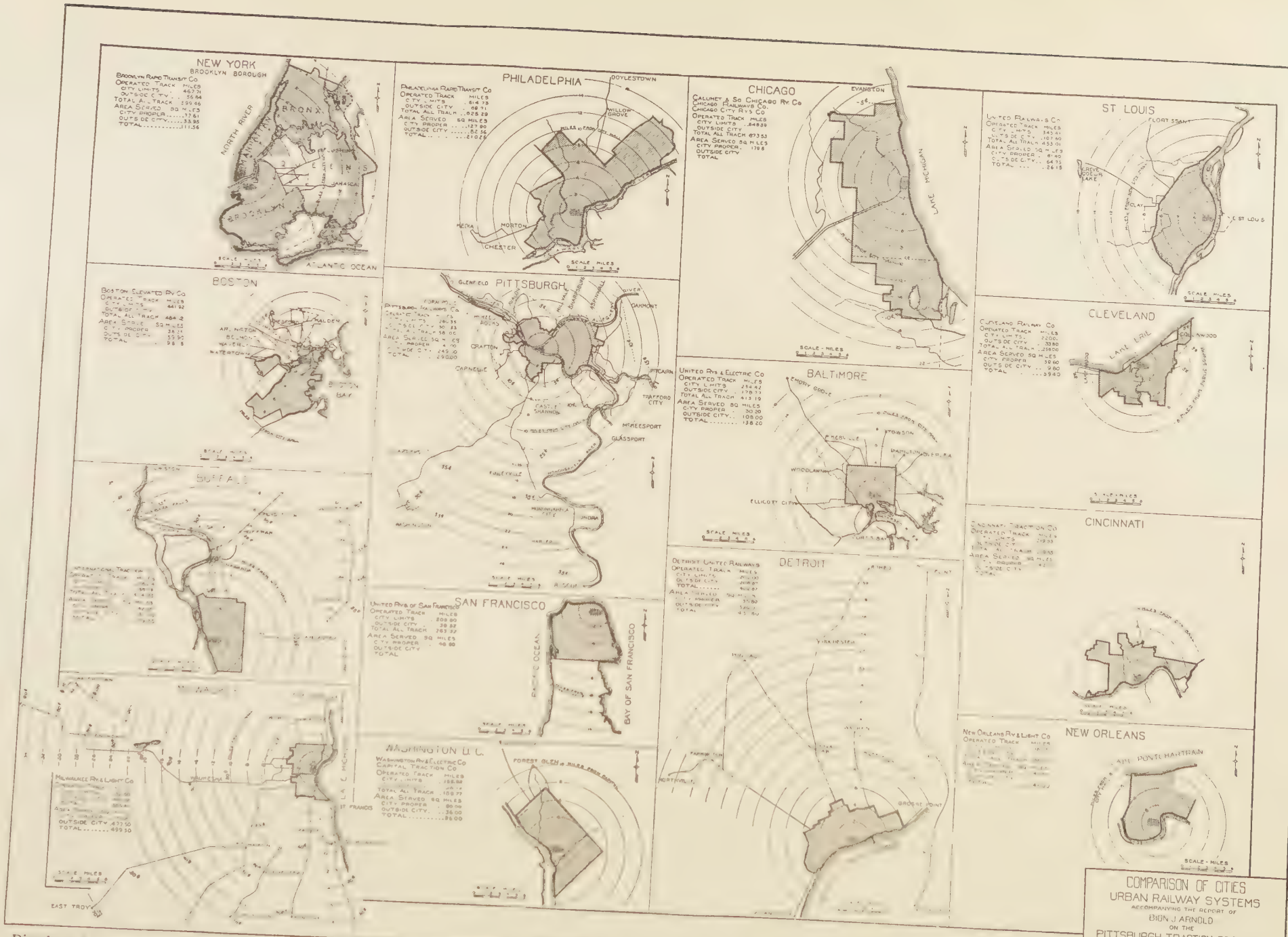
On this subject Mr. Arnold states that the riding habit of people increases from year to year as the community grows, as its business, family and social life become more and more complex and as its facilities of intercommunication improve. Broadly speaking, the traffic increases as the square of the population. In this connection the report shows records of the growth of traction earnings and of the population of several different American cities on the logarithmic chart reproduced herewith. In this diagram the "earnings per year" are used as ordinates and the "tributary population" used as abscissas.

A peculiarity of logarithmic section paper is that equations in which one number varies as the power of another are represented by straight lines instead of by curves and the slope of the line representing an equation indicates the exponent of the variable whose power varies with the first power of the other variable in the equation. In the diagram herewith a small chart in the upper left-hand corner gives the key to the exponents shown on the large chart. Small index numbers are also given on the chart to show the slope of the line and the corresponding relation between the earnings and the population. As will be seen, some of the lines show in parts of their curves a relation greater than $y = x^3$, where y is the earnings


EARNINGS PER YEAR. $
90,000,000
80,000,000
70,000,000
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
9,000,000
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
100,000
TRIBUTARY POPULATION
1,000,000
SCALE FOR SLOPES ON PLATE
N EXPONENT OF EQUATION Y = X^N
KEY
0-1900 FISCAL YEAR
^ 1909
Δ 1910
o OTHER YEARS
SQUARE RELATION EARNINGS INCREASING AS SQUARE OF POPULATION
DESCRIPTION OF LOGARITHMIC PLOT
On this logarithmic section paper relations between two variables are plotted in the same manner as on linear section paper. But in the resulting plot there is this difference:—Assuming for example that earnings increase as the square of the population, on linear paper this relation would result in a gradually ascending curve, on log paper, however, it becomes a straight line with a slope of two to one. And any other data that plot out with a slope of two to one may be at once recognized as embodying the square. Similarly a relation plotting out with a slope of three to one embodies the cube, etc. Hence it is only necessary to focus attention on the slope of the lines plotted.
Now in the diagram two points are plotted for each city in order to define the average growth during the past decade. For the upper point the earnings for the last fiscal year are plotted with the corresponding population derived from the 1910 census. A line connecting these points represents the true average relation between these variables and the slope of the line, the rate of change as expressed by a power such as the square, cube, etc; or fractional parts thereof. To illustrate—if in 1900 there were 1,000,000 people and $10,000,000 earnings and in 1910 there were 2,000,000 people and $40,000,000 earnings, respectively, then the vertical rise in earnings is twice the horizontal growth in population, which means that earnings increase as the square of the population
CHICAGO
BROOKLYN
BOSTON
PHILADELPHIA
GREATER NEW YORK
ST LOUIS
CINCINNATI
DETROIT
TWIN CITIES
CLEVELAND
BALTIMORE
PITTSBURGH
NEW ORLEANS
WASHINGTON
BUFFALO
MILWAUKEE
INDIANAPOLIS
MONTREAL
TORONTO
DENVER
COLUMBUS
ALBANY
TOLEDO
LOUISVILLE
MEMPHIS

Pittsburgh Report—Relation Between the Increase of Population and of Traction Earnings as Plotted on Logarithmic Section Paper

Pittsburgh Report—Comparison of Earnings, Expenses and Track Mileage of Large Urban Railway Properties on a Car-Mileage Basis



Pittsburgh Report—Comparison of Urban Railway Systems—Suburban Railways Are Shown Where They Are Operated Directly by the City Traction System as in Pittsburgh, Milwaukee and Detroit

and x is the population. Others have a lower ratio, but practically none show as slow a growth as a direct ratio between the earnings and the population.

In discussing this diagram Mr. Arnold gives several reasons for the variations of the line showing the Pittsburgh ratio, the principal one being that some years ago the system was extended rapidly into outlying territory and that business depressions have been particularly felt in the Pittsburgh district.

INVESTMENT IN INCREASING FACILITIES

On this point Mr. Arnold says:

"All of the developments of the science of transportation have a decided tendency toward reducing the actual operating cost of moving passengers. On the surface lines the use of larger cars reduces the cost per seat per mile; the electrified railroad lines are operating at a less cost per car mile with electric motors than they formerly did with steam locomotives, and subway cars of twice the capacity of surface cars can be run at double the speed and at almost half the operating cost per car mile of the trolley car. In other words, a larger investment per dollar earned can be made with the more modern equipment, and this fact expressed within reasonable limits in actual figures may be stated as follows:

APPROXIMATE EXPENDITURES FOR TRANSIT FACILITIES

Share Apportioned to	Increased Annual Earnings.	Average Rate.	Additional Investment.
Surface systems	$15,000,000	$3.50	$52,500,000
Subways and other "rapid transit" facilities	10,000,000	7.00	70,000,000
Electrified railroads	5,000,000	5.00	25,000,000
Total	$30,000,000		$147,500,000

"For surface systems each additional dollar earned will justify an investment of $3 to $4.

"For electrified railroads each additional dollar earned will justify an investment of $4 to $6.

"For subway systems each additional dollar earned will justify an investment of $6 to $8.

"Following is an approximate estimate of the summation of future expenditures for transit facilities in the Pittsburgh district to be made by the time the district has a population of 2,000,000. This is believed to be conservative and possible of execution.

"This means that a comprehensive transportation program should involve the plans for the expenditure of between $140,000,000 and $150,000,000 in the Pittsburgh district. These figures give a fair idea of the magnitude of the Pittsburgh transportation problem."

ANALYSIS OF OPERATING RESULTS ON CAR-MILEAGE BASIS

The diagram on page 259 is from the report and shows the results in a large number of American cities on the car-mileage basis, with the corresponding earnings and the operating expenses.

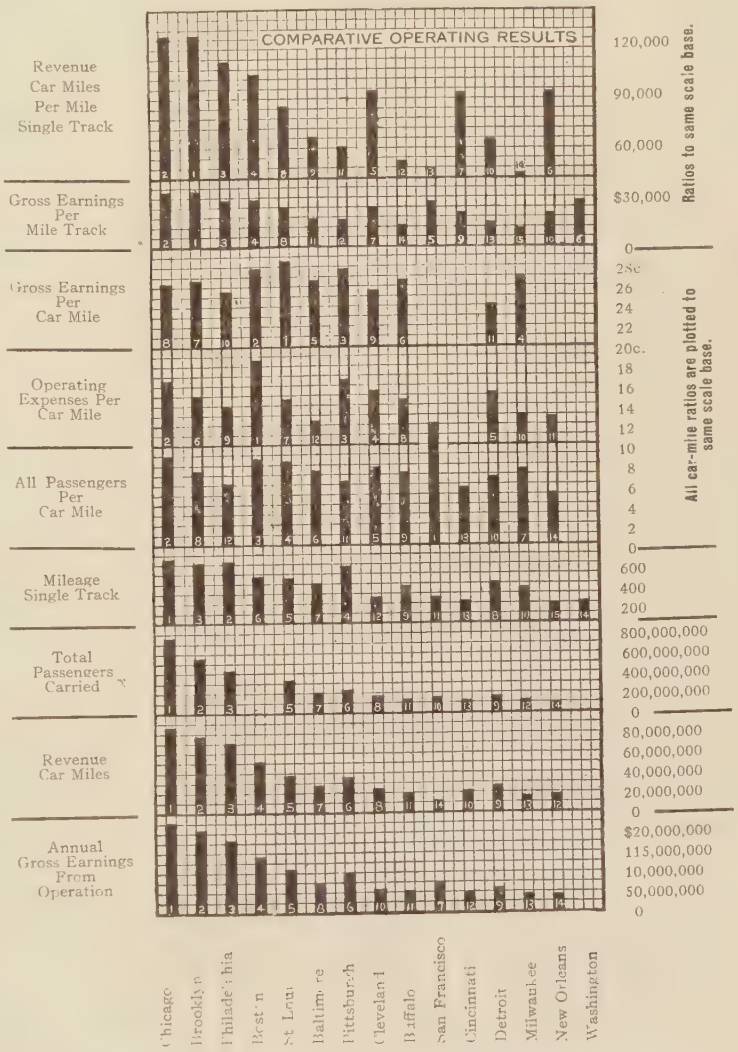
Revenue car miles are plotted along the horizontal axis and gross earnings along the vertical axis, thus showing the variation between two quantities instead of the yearly variation in one. In explanation of this diagram the report says, in part:

"On account of the slight difference in fares, the difference in the average length of rides in the various cities, the variation in the size of the cars and the character of the riding in different localities, earnings per car mile is not an exact measure, but taken in connection with the other elements of the analysis it is the most consistent one for comparing each system with itself from time to time and for making a relative study of the different systems.

"It will be noted, for instance, that in Brooklyn the earnings per car mile increased from 24 cents in 1902 to 29 cents in 1906 and then decreased to 26.85 cents in 1910. In Philadelphia the earnings per car mile first decreased from 23.4 cents in 1906 to 22.48 cents in 1907 and then increased to 25.6 cents in 1910. In Boston the tendency has been to increase the earnings per car mile slightly each year until 1909, when for some reason the number of car miles operated was reduced, although the earnings increased, the result being that the earnings per car mile showed a decided increase during this last year. St. Louis has consistently shown earnings near the 28-cent line until 1909, when the record shows 28.57 cents. Pittsburgh's record has been more erratic than the other cities. During the panics of 1904 and 1908 there was a much greater reduction in car miles in Pittsburgh than in any other city. On the other hand, Pittsburgh shows a larger increase in car miles in proportion to the increase in earnings during the last year than any other city."

The report also calls attention to the fact that the results reported from Boston, Brooklyn and Philadelphia include the earnings from operation of the elevated roads, which in those cities form a part of the complete system with transfer privileges, and also that corresponding curves, showing the operating expenses and the cost of transportation and power, are given. In general, these groups of curves show the same characteristics as the curves already mentioned. For ready reference, the operating ratio both with and without taxes is plotted along the upper margin of the diagram. The dotted line indicates that taxes are not included.

For further comparison the relation between the track mileage and car mileage has also been plotted on this plate. In the report itself tables are published showing these relations and others.



Pittsburgh Report—Comparative Operating Results of Large Urban Traction Systems

The diagram on this page shows graphically the comparative results given in most of these tables, and states that Pittsburgh ranks sixth among the cities in earnings, car miles and passenger traffic, and relatively higher (fourth) in track mileage, but that it ranks eleventh or twelfth in car miles and earnings per mile of track. The car-mile records are rendered somewhat

uncertain by varying practice in counting transfers and computing car-mileage. Thus Pittsburgh ranks third in earnings and expenses per car mile, but eleventh in passengers per car mile. This is explained largely by the fact that Pittsburgh gives few transfers. In other cities revenue passengers are recounted more times than in Pittsburgh—in Chicago as high as 58 per cent more. All the car-mile ratios from Pittsburgh are influenced by the fact that trailers are counted as full car mileage.

Mr. Arnold believes these records show that the Pittsburgh system is relatively over-expanded as compared to larger and more densely settled cities. This indicates there is opportunity for cultivation of traffic along the lines already constructed and he suggests the development of the "riding habit," the possibilities of a saving in maintenance and power cost and probably the introduction of a more liberal transfer policy and a greater attention to a short-haul business.

CITY PLANNING AND TRANSPORTATION

The report then discusses the relation of city planning and transportation. It points out that a community appears to crystallize about natural centers and that when the traffic between these centers develops along the natural lines these lines should be encouraged and perpetuated. In this connection the plan of different American cities and their transportation systems, published on page 260, is presented.

In discussing the equipment which should be provided for a good service with growing demands, Mr. Arnold says that the expenditures for this purpose in Pittsburgh should amount to $10,000,000. He then says:

"Future renewals of equipment should be provided for out of earnings at the rate of at least $1,000,000 per year, which means an annual depreciation fund for future obsolescence equal to about 10 per cent of the gross earnings.

"Equipment to provide for future extensions, betterments and improvements should be purchased at the rate of at least $3 of new investment for each additional dollar of annual earnings. As earnings are increasing about $800,000 per year, the new capital available annually should amount to $2,500,000."

He believes additional track connections are necessary and that a universal transfer system might be tried with the understanding that if it did not produce sufficient revenue a charge should be made for certain transfers. Pittsburgh is not yet ready for a subway system, but if its transportation earnings should increase as the square of the population and the downtown terminal facilities of a subway system could be properly combined with the rapid transit surface of the electrified suburban lines, the city may be ready for a subway system in about 1920. In conclusion he recommends a system of city control to cover the entire Pittsburgh district, with sufficient power to lay out a general plan for the entire community, to determine the rate of return on the investment, the rates of fare to be charged, the amount of funds to be set aside for insurance, depreciation, etc., to adjust taxation, paving and other requirements, to bring about a combination of surface and subway facilities with electric, steam and suburban lines, etc.

In the appendices the report discusses the question of rerouting, and gives the method employed for counting passengers on individual roads; a comparative analysis of traction ordinances in Chicago, Cleveland and Philadelphia; a digest of public service laws and an account of traction ordinances in Chicago, Cleveland, Philadelphia and Los Angeles.

At the annual convention of the Wisconsin Electrical Association, held in Milwaukee on Jan. 18, W. J. Kelsh, superintendent of rolling stock, Wisconsin Electric Railway Company and Eastern Wisconsin Railway & Light Company, read a paper on "Electric Railway Repair Shop Practice." An abstract of this paper was published on page 122 of the Electric Railway Journal of Jan. 21. Mr. Kelsh said that when oil was used 50 per cent less babbitt was required than when grease was used as a lubricant. This statement was incorrectly reported on page 166 of the issue of Jan. 28. Mr. Kelsh advises that with oil lubrication he gets 50 per cent more mileage or longer wear for his bearings than with grease lubrication.

CENTRAL ELECTRIC RAILWAY ASSOCIATION COMMITTEES

E. B. Peck, president of the Central Electric Railway Association, has announced the following committee appointments for the year 1911:

STANDING AUDITING COMMITTEE

Walter Shroyer, chairman, auditor Indiana Union Traction Company.

L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company.

E. L. Kasemeier, auditor Ohio Electric Railway.

COMMITTEE ON RULES AND REGULATIONS GOVERNING ANNUAL TRANSPORTATION

W. S. Whitney, chairman, general freight and passenger agent Ohio Electric Railway.

H. A. Nicholl, general manager Indiana Union Traction Company.

F. W. Brown, general freight and passenger agent Michigan United Railways.

J. O. Wilson, general passenger agent Cleveland, Southwestern & Columbus Railway.

M. J. Insull, general manager Louisville & Northern Railway & Lighting Company.

CONSTITUTION AND BY-LAWS COMMITTEE

F. D. Carpenter, chairman, general manager Western Ohio Railroad.

A. A. Anderson, general manager Springfield Consolidated Railway.

A. W. Brady, president Indiana Union Traction Company.

F. W. Brown, general freight and passenger agent Michigan United Railways.

W. S. Whitney, general freight and passenger agent Ohio Electric Railway.

CLAIMS COMMITTEE

E. C. Carpenter, chairman, claim agent Indiana Union Traction Company.

J. H. Shan, claim agent Cleveland, Painesville & Eastern Railroad.

Wm. Tichenor, claim agent Terre Haute, Indianapolis & Eastern Traction Company.

F. E. Rankin, claim agent Detroit, Monroe & Toledo Short Line Railway.

H. Rimelspach, claim agent Lake Shore Electric Railway.

M. J. Insull, general manager Louisville & Northern Railway & Lighting Company.

A. L. Neereamer, secretary Central Electric Railway Association, Indianapolis, Ind.

FINANCE COMMITTEE

F. D. Carpenter, chairman, general manager Western Ohio Railroad.

A. W. Brady, president Indiana Union Traction Company.

W. G. Irwin, president Indianapolis, Columbus & Southern Traction Company.

H. E. Vordermark, auditor Fort Wayne & Wabash Valley Traction Company.

C. N. Hawley, auditor Toledo, Port Clinton & Lakeside Railway.

C. N. Wilcoxon, general manager Chicago, Lake Shore & South Bend Railway.

HOTEL COMMITTEE

W. H. Bloss, chairman, Ohio Brass Company.

L. J. Drake, Jr., Galena Signal Oil Company.

T. A. Hankle, Electric Service Supplies Company.

S. D. Hutchins, Westinghouse Traction Brake Company.

J. A. Gohen, Cleanola Company.

F. A. Willard, Burroughs Adding Machine Company.

INSURANCE COMMITTEE

H. N. Staats, chairman, American Railway Insurance Company.

F. W. Coen, general manager Lake Shore Electric Railway.

H. B. Clegg, president Dayton & Troy Electric Railway.

LIGHTNING ARRESTER COMMITTEE

Edw. Heydon, chairman, superintendent overhead construc-

tion Terre Haute, Indianapolis & Eastern Traction Company.

F. T. Bundy, master mechanic Ohio Electric Railway.

Fred Heckler, master mechanic Lake Shore Electric Railway.

C. E. Morgan, general manager Indianapolis, Crawfordsville & Western Traction Company.

H. D. Murdock, superintendent Indianapolis & Louisville Traction Company.

COMMITTEE ON COMPENSATION FOR HANDLING UNITED STATES MAIL

A. W. Brady, chairman, president Indiana Union Traction Company.

F. W. Brown, general freight and passenger agent Michigan United Railways.

Geo. Whysall, receiver Columbus, Marion & Bucyrus Railway.

W. A. Carson, general manager Evansville Railways.

PUBLICITY COMMITTEE

Geo. S. Davis, chairman, editor *Electric Traction Weekly.*

L. E. Gould, Western editor ELECTRIC RAILWAY JOURNAL.

E. B. Grimes, vice-president Ohmer Fare Register Company.

STANDARDIZATION COMMITTEE

H. H. Buckman, chairman, master mechanic Louisville & Northern Lighting & Railway Company.

W. P. Graydon, master mechanic Western Ohio Railroad.

W. H. Evans, superintendent motive power Indiana Union Traction Company.

F. J. Foote, master mechanic Ohio Electric Railway.

W. E. Ralston, superintendent power and shops Cleveland, Southwestern & Columbus Railway.

L. W. Jacques, master mechanic Fort Wayne & Wabash Valley Traction Company.

L. M. Clark, master mechanic Terre Haute, Indianapolis & Eastern Traction Company.

R. N. Hemming, secretary, general manager Ohio & Southern Traction Company.

SUBJECT COMMITTEE

Geo. Whysall, chairman, receiver Columbus, Marion & Bucyrus Railway.

H. A. Nicholl, general manager Indiana Union Traction Company.

C. D. Emmons, general manager Fort Wayne & Wabash Valley Traction Company.

J. Jordan, general manager Cleveland, Painesville & Eastern Railroad.

G. W. Parker, general freight agent Detroit, Monroe & Toledo Short Line Railway.

C. C. Collins, trainmaster Western Ohio Railroad.

Will H. Bloss, Ohio Brass Company.

SUPPLY MEN'S COMMITTEE

S. D. Hutchins, chairman, Westinghouse Traction Brake Company.

John F. Ohmer, president Ohmer Fare Register Company.

W. H. Bloss, Ohio Brass Company.

L. J. Drake, Jr., secretary Galena Signal Oil Company.

H. C. Marsh, General Electric Company.

TRANSPORTATION COMMITTEE

G. K. Jeffries, chairman, general superintendent Terre Haute, Indianapolis & Eastern Traction Company.

H. C. Warren, general manager Toledo & Indiana Traction Company.

Geo. Whysall, receiver Columbus, Marion & Bucyrus Railway.

A. Shane, general manager Indianapolis, Columbus & Southern Traction Company.

J. F. Keys, general passenger agent Detroit, Monroe & Toledo Short Line Railway.

E. F. Schneider, general manager Cleveland, Southwestern & Columbus Railway.

B. J. Jones, general manager Ohio Electric Railway.

C. F. Franklin, general superintendent Winona Interurban Railway.

VIGILANCE AND MEMBERSHIP COMMITTEE

C. D. Emmons, chairman, general manager Fort Wayne & Wabash Valley Traction Company.

F. W. Brown, general freight and passenger agent Michigan United Railways.

Geo. Whysall, receiver Columbus, Marion & Bucyrus Railway.

R. A. Crume, general manager Dayton & Troy Electric Railway.

T. F. Grover, general manager Terre Haute, Indianapolis & Eastern Traction Company.

F. H. Cuttshall, auditor Chicago, South Bend & Northern Indiana Railway.

Will H. Bloss, Ohio Brass Company.

L. E. Gould, Western editor ELECTRIC RAILWAY JOURNAL.

CENTRAL ELECTRIC RAILWAY TRAFFIC ASSOCIATION COMMITTEES

The committees of the Central Electric Traffic Association for the year 1911 are given in the following paragraphs. The chairman of the association is A. L. Neereamer, whose office is in 308 Traction Terminal Building, Indianapolis, Ind.

STANDING AUDITING COMMITTEE

Walter Shroyer, chairman, auditor Indiana Union Traction Company.

L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company.

E. L. Kasemeier, auditor Ohio Electric Railway.

INTERCHANGEABLE MILEAGE TICKET COMMITTEE

F. D. Norviel, chairman, general freight and passenger agent Indiana Union Traction Company.

W. S. Whitney, general freight and passenger agent Ohio Ohio Electric Railway.

C. C. Collins, trainmaster Western Ohio Railway.

INTERLINE BAGGAGE COMMITTEE

C. O. Sullivan, chairman, general freight and passenger agent Winona Interurban Railway.

R. W. Waite, treasurer Louisville & Northern Railway & Lighting Company.

O. H. Murlin, general passenger agent Dayton & Troy Electric Railway.

JOINT PASSENGER TARIFFS COMMITTEE

W. S. Whitney, chairman, general freight and passenger agent Ohio Electric Railway.

F. D. Norviel, general freight and passenger agent Indiana Union Traction Company.

C. J. Laney, trainmaster Toledo, Bowling Green & Southern Traction Company.

JOINT FREIGHT TARIFFS COMMITTEE

C. C. Collins, chairman, trainmaster Western Ohio Railroad.

F. I. Hardy, superintendent of transportation Fort Wayne & Wabash Valley Traction Company.

L. D. Johnson, general freight agent Dayton & Troy Electric Railway.

S. Ridlen, general freight and passenger agent Indianapolis, Crawfordsville & Western Traction Company.

Chas. A. Floyd, general freight and passenger agent Grand Rapids, Holland & Chicago Railway.

OFFICIAL INTERURBAN MAP COMMITTEE

G. M. Patterson, chairman, trainmaster Toledo & Chicago Interurban Railway.

J. H. Crall, general freight and passenger agent Terre Haute, Indianapolis & Eastern Traction Company.

O. H. Murlin, general passenger agent Dayton & Troy Electric Railway.

G. S. Henry, trainmaster Indianapolis & Cincinnati Traction Company.

C. C. Trees, auditor Kokomo, Marion & Western Traction Company.

OFFICIAL INTERURBAN GUIDE COMMITTEE

C. C. Collins, chairman, trainmaster Western Ohio Railroad.

W. S. Whitney, general freight and passenger agent Ohio Electric Railway.

J. H. Crall, general freight and passenger agent Terre Haute, Indianapolis & Eastern Traction Company.

F. D. Norviel, general freight and passenger agent Indiana Union Traction Company.

R. J. Thompson, train dispatcher Indianapolis & Louisville Traction Company.

BOOSTER COMMITTEE

F. D. Norviel, chairman, general freight and passenger agent Indiana Union Traction Company.

C. C. Collins, trainmaster Western Ohio Railroad.

J. H. Crall, general freight and passenger agent Terre Haute, Indianapolis & Eastern Traction Company.

O. H. Murlin, general passenger agent Dayton & Troy Electric Railway.

C. O. Sullivan, general freight and passenger agent Winona Interurban Railway.

PRIZE ARTICLE BY PORTLAND (ORE.) TRAINMAN ON "HOW TO AVOID ACCIDENTS"

Prizes were offered recently by the Portland Railway, Light & Power Company, of Portland, Ore., for articles by trainmen on the subject: "How to Avoid Accidents." Sixty articles were received. The first prize was won by Paul Bartholomew. An abstract of Mr. Bartholomew's article follows:

"Trainmen about to enter upon the duties of their day's work should be in good physical condition.

"The conductor and the motorman assigned to the same car ought to be on good terms with one another and work in harmony constantly.

"A motorman should know before taking his run that his car is in good working order and that he has sand in the sandbox. The hand brakes of cars that are equipped with air brakes ought to be tested frequently. The motorman should know, in case of hand brake and air brake failing, what to do to stop his car.

"A motorman should never attempt to pass a car on the opposite track while his car is running over a switch the point of which is pointing toward him, no matter if the style of switch is a lock switch, for it is known that sometimes cars will split those switches. A motorman should never pass another car on a paved street or other improved street at a high rate of speed, but rather throw off power and be ready for any emergency that might arise. Should the passing point be at a cross street he should sound his gong and hold his car in check. Where another car is standing to let off or take on passengers or for some other cause the motorman should have his car controlled so that he can stop instantly.

"Where streets are partly obstructed by building material or by standing vehicles, etc., and the view of the street is not complete, the motorman should sound his gong and at the same time have perfect control of his car. In passing vehicles that are moving in the same direction the motorman should ascertain if the driver is conscious of the approach of his car.

"In passing horses, cows, etc., tied at the back end of wagons motormen should exercise great care. Care should also be taken in passing refractory horses; always wait till such animals are subdued before attempting to pass them.

"Motormen should exercise the greatest care in passing school houses during the recess and closing hours.

"Motormen should exercise the greatest precaution during holidays, circus days and festivals, etc., when the streets are one mass of humanity and cars are loaded to suffocation; then, above all things, they must be on their guard.

"In loading up his car, especially after dark, where people board with a rush at both ends and possibly his car has not had time to stop, the motorman should place himself in such a position as to protect his controller and brake. When the conductor gives him the signal to go ahead he should start his car just as slowly as possible, for as long as the car is standing people will catch hold of handles or put a foot on the step, even if they know that it is quite impossible for them to get on.

"When he begins to unload he should be just as careful in starting his car, for on loaded cars it is always necessary for some one to step on the ground to make room for others to get off and perhaps the conductor is inside collecting fares.

"Greater care should be exercised after dusk, when objects are not so easily discernible. The motorman should have his headlight burning and the conductor should have the car lighted up. In dark streets the motorman should never let his vigilance lapse. During stormy weather, if unable to keep the front window clear, he should lower window in order to obtain an unobstructed view of his path.

"Trainmen should at all times exercise the greatest care in the handling of passengers. In starting or stopping his car the motorman should do it as easily as possible. Before starting his car he should be sure that no one is in the act of getting on or off the front entrance of car.

"In following a car a motorman should use good judgment. If the car ahead is moving slowly and he is close to it he should carefully keep his distance. If moving rapidly he should allow a space of at least a block between his car and leader. If the track is slippery or the car is running down grade he should increase the intervening space, always bearing in mind that the other motorman might have to make a sudden stop. During the hours when traffic is congested and cars move a little distance at a time he should be very watchful, always allowing his leader to take a little headway so that when his car starts he may be able to move some distance without having to throw power off and on.

"Another place where a motorman has to be vigilant is on the bridges, especially after the draw has been opened and long lines of cars and vehicles of all sorts have accumulated so that the approach is congested. During foggy weather a motorman should endeavor to run his car as carefully as possible. Motormen should always take good precaution in running down grades. The car should never be allowed to get beyond your control where the grade is very steep.

"At steam road crossings, where the conductor has to get off the car to flag, after making the stop the motorman should, before starting his car across, be sure no one is getting on or off; if it is dark the front door should be left open so that he can see. The car should be started as slowly as possible and before reaching the danger line he should satisfy himself that he is safe to go ahead.

"Motormen upon hearing unusual sounds pertaining to the working of their cars should investigate the cause thereof.

"Don't leave your car standing on a grade; if compelled to do so have the conductor station himself at the forward end with instructions what to do.

"Don't talk to passengers when operating the car. Your whole attention should be with your work.

"Don't allow children to play around or on your car when at the end of the line. Don't allow small children around the controller when operating the car."

RECENT EXTENSIONS IN CONNECTICUT

During the past six months the Connecticut Company has extended its lines an aggregate of 12.752 miles. These extensions are divided among the different districts as follows:

Bridgeport	5.873	miles
[illegible]	[illegible]	"
Hartford	2.893	"
[illegible]	[illegible]	"
[illegible]	[illegible]	"
New Britain	.977	"
New Haven	.577	"
New London	.162	"
[illegible]	[illegible]	"
Waterbury	1.711	"
[illegible]	[illegible]	"

On June 30, 1910, the track mileage of the system, as reported to the Railroad Commission, was 768.628. From the extensions made during the past six months 0.409 mile should be deducted for shortening of extensions, renewal of crossovers, etc., so that the aggregate mileage on Jan. 1, 1911, of the Connecticut Company was 780.971.

COMMENTS ON THE SAFETY OF OPERATION OF ELECTRIC ROADS

BY A. GORDON DYE, ROCHESTER, N. Y.

I have read the reports of the Jan. 19 conference at Syracuse, N. Y., with interest, but it seems to me from my personal experience as conductor, motorman and train dispatcher that there is one point on which greater stress might be laid. I believe that greater effort should be made to reduce the chance of forgetfulness to a minimum. Some men are naturally nervous, erratic or irresponsible, and if these characteristics are detected in an employee he should be discharged before he has a chance to get into trouble. But the great majority of accidents happen to men who are experienced and methodical and cannot justly be accused of carelessness or stupidity. In fact during my past five years' connection with a high-speed, single-track electric road I have not known of a single case where a crew has made a mistake because they have misunderstood the rules or an order, but I have known of several cases where mistakes have been made as the result of forgetfulness and fortuitous circumstances alone prevented serious wrecks.

In view of this experience, which I believe may be duplicated on almost any road, it is worth while to ask ourselves why we remember and why we forget. A little introspection will show that a large number of things contribute causes to the flow of thought. A glance at the clock may bring some duty to mind, a chance sound or word may start another sequence of thought, a statement heard or read may arouse strong feeling, and one thought will crowd another out of the mind.

Introspection will also show that all or nearly all of the thoughts which pass through one's field of consciousness are there because they have been suggested by some other thought or by some impression received through the sensory organs. Therefore if we wish to reduce to a minimum the chances of forgetting a given thing we must surround ourselves with things which will suggest that which we wish to remember. Various devices may be used to remind us of a given fact, duty or obligation, and ordinarily the mere routine of our work is sufficient to accomplish this. It is in this respect that experience is valuable in railroading. If a man is accustomed to meet a train at a given point the physical surroundings of that point will tend to remind him of the meet, even though he may be thinking of something else as he approaches the meeting point. His habits of thought and action will also tend to make him remember where a man who has not acquired these railroad habits might forget.

But routine alone is not sufficient at all times to prevent important things from being supplanted in the consciousness at inopportune times, as is evident from the slips of memory that have occurred. Hence we must supplement routine with devices to suggest and help the memory. Most roads hold the conductor and motorman equally responsible for train movements, yet no means are used to compel the conductor to check the motorman on meets, with the result that conductors become very negligent in this respect. This leaves only the motorman to safeguard the train. To overcome this it might be well to arrange a small rack in the cab in which the numbers of trains to be met could be arranged in order before a train leaves its terminal and require the conductor to go to the cab and remove the train numbers in order as the trains are met. This would forcibly call the attention of both conductor and motorman to the meet and should prevent both from forgetting. Where meets are made on double track or long sidings the motorman should be required to call the attention of the conductor to an approaching train by a bell and the conductor should give the motorman a bell when approaching a meeting point. All special orders affecting the movement of a train should be hung where they may be easily seen and read from time to time. If by such means we can reduce the chances of forgetfulness we ought to be able to operate safely under the standard American Railway Association rules.

TESTIMONY BEFORE THE RAILROAD SECURITIES COMMISSION

The Railroad Securities Commission, which is investigating the subject of the issue of securities, held sessions in Chicago during the week beginning Jan. 23. Testimony was received from bankers, railroad and other corporation officials and members of commissions.

Prof. Henry C. Adams, statistician of the Interstate Commerce Commission, said that if possible the actual cost of railroad properties should be ascertained and a reasonable return allowed on the investment thus determined.

Marvin Hughitt, chairman of the board of directors of the Chicago & Northwestern Railway, said that he was impressed with the necessity of proceeding in the matter of regulation with as much freedom from prejudice and haste as was consistent, because it was clear to him that the States had rights and that they would cling to them tenaciously. He doubted the advantage to the public of having the federal government go much further than it had gone in the control of railroads.

E. K. Boisot, vice-president of the First Trust & Savings Bank of Chicago, expressed the opinion that the unrestricted sale of railroad stocks and bonds was necessary in order to carry out fully the development of territory in the West.

John J. Mitchell, president of the Illinois Trust & Savings Bank of Chicago, said that if the railroads were restricted to the issue of stock at par construction would be confined solely to the extension and improvement of existing lines.

F. A. Delano, president of the Wabash Railroad, said that if roads were to be valued on the basis of original cost or the cost of reproduction the ill-conceived roads would be overvalued and the well-conceived roads would be undervalued.

Rufus C. Dawes, president of the Union Gas & Electric Company, said that since the government exercised the power of regulation and could not guarantee earnings it must not interfere more than was necessary with the manner by which capital was attracted to enterprises.

Burton Hanson, general counsel of the Chicago, Milwaukee & St. Paul Railway, said that he was not sure but that federal regulation of securities was entirely practicable. If the issue of securities by interstate carriers came within the right to regulate commerce he thought that Congress could exercise that power to the exclusion of the States. It was impracticable to have two kinds of regulation at the same time, and the federal government ought to be supreme.

George M. Reynolds, president of the Continental and Commercial National Bank of Chicago, although favoring federal supervision as preferable to that of the States, was opposed to a too rigid control. He pointed out the danger that the public might assume that the government was overseeing the management of the railroads and might hold it to account in the case of failure or depreciation of securities.

John H. Roemer, member of the Railroad Commission of Wisconsin, said that in cases of overcapitalization the question should be taken into consideration whether such capitalization had been honest or had been the result of misrepresentation. It was in the interest of the public that such business mistakes should be prevented in future by strict supervision. Wisconsin was preparing new laws for the issue of railroad securities without a designated money value.

W. H. Williams, member of the Texas Railroad Commission, opposed the extension of federal control as an interference with State control.

The report of J. Lambert Payne, Comptroller of Railway Statistics, shows that the mileage of electric railways in Canada increased from 989 miles in 1909 to 1049 in 1910. Capital liability increased from $91,604,989 to $102,044,979. Gross earnings for 1910 were $17,100,789, an increase of $2,275,853. Net earnings reached $5,389,276; 360,964,786 passengers and 853,294 tons of freight were carried, while the employees numbered 11,390 and the wages paid amounted to $6,316,777.

REPORT TO STOCKHOLDERS OF CLEVELAND RAILWAY

At the annual meeting of stockholders of the Cleveland Railway on Jan. 25 a report was presented by John J. Stanley, the president, which gave the earnings and reviewed the conditions with which the company is now confronted.

Mr. Stanley recalls the fact that under the ordinance which went into effect on March 1, 1910, the company was required to put into operation a cash fare of 3 cents and 1 cent charge for a transfer, this rate to continue in force for eight months or longer if the company should not within five months have installed 450 pay-enter cars. Mr. Stanley adds: "Although more than 450 pay-enter cars have been placed upon the road, the initial rate of fare is still in force.

"The company's suburban franchises, of course, were not repealed by the new Cleveland grant, except as to such parts of the city as were within the city limits at the time of its passage, and the rates of fare now collected in Lakewood and several other suburbs, and in that part of Cleveland that was formerly Collinwood, are the same as were in effect before the Cleveland grant was accepted, viz., 5 cents cash fare or 11 tickets for 50 cents. The average rate of fare, therefore, on the system has been considerably in excess of 3 cents. To be exact, the company's passenger receipts in the 10 months of operation under the Tayler grant, including receipts from the sale of transfers, have been 3.39 cents per passenger. The gross earnings from all sources have been 3.57 cents per passenger.

"The ordinance provides for the establishment of what is called an 'interest fund,' which is to be maintained from earnings at all times at a sum equal to $500,000. The purpose of this fund is to assure the payment of taxes and interest, including payments to stockholders quarterly of 1½ per cent upon the face value of their stock. There was in the interest fund at the close of the fiscal year $750,921 in cash. Part of this was for interest accrued on bonds to Dec. 1, but not payable until March 1, and part of it for accrued taxes.

"The ordinance limits the amount that may be expended for operating expenses to 11½ cents per car-mile, and the amount that may be expended for keeping up the company's property to substantially 5 cents per car-mile, unless the allowance is increased by the Council or by arbitration. The cost of operation has exceeded these allowances, and your directors have asked that the operating expense allowance be raised to 12½ cents per car-mile. To provide for the renewals that ought to be made in 1911 and 1912 it will probably be necessary to increase also the maintenance allowance.

"The earnings and the cost of maintenance and operation, including taxes and interest on bonds, notes and capital stock, in the 10 months of operation at the initial rate of fare fixed in the ordinance, have been as follows:

			Cents Per Car Mile.
Disbursements for maintenance	$1,283,058		5.76
Disbursements for operation	2,593,218		11.64
Total	$3,876,276		17.40
Taxes	310,598		1.39
Interest	1,128,023		5.07
Total		$5,314,897	23.86
Gross earnings from operation	$5,166,370		
Miscellaneous income	30,101		
Total		5,196,471	23.33
Deficit		$118,426	.53

"The ordinance allowance of 11½ cents per car mile for operating expenses was $32,011 less than the actual expenses.

"The ordinance allowance for maintenance of the property fell short of the amount needed and expended for the purpose by $140,138.

"The reports for December and for the 10 months have just been completed, and the city street railroad commissioner has had very little time in which to audit them. They are submitted to you subject to his correction.

"To complete the report for the entire 12 months of 1910 there should be added to the 10 months' statement the earnings and expenses of the first two months of the year, under the management of Mr. Bicknell. The earnings of the property and the cost of operating it in those months were as follows, as shown by Mr. Bicknell's report:

Gross earnings from operation	$957,271.56
Operating expenses	639,466.67
Net earnings from operation	$317,804.89
Miscellaneous income	6,635.51
Gross income, less operating expenses	$324,440.40
Taxes	52,064.24
Income, less operating expenses and taxes	$272,376.16
Interest	225,428.60
Surplus	$46,947.56

"These figures added to the figures for the 10 months give the following totals for the year:

Disbursements for maintenance and operation	$4,515,743	
Taxes	362,662	
Interest	1,353,451	
Total		$6,231,857
Gross earnings from operation	$6,123,641	
Miscellaneous income	36,737	
Total		6,160,378
Deficit		$71,478

"The expenses of the last four months of the year were proportionately greater than in the six months from March 1 to Sept. 1. The increase was due largely to an increase in wages. In May the motormen and conductors of the company, acting under an agreement made with them in December, 1906, demanded an increase in their wages from an average rate of about 25 cents to a flat rate of 32 cents per hour. Your officers refused to grant the increase, and demand was then made for arbitration, in accordance with the agreement. A board of arbitrators, consisting of Elroy M. Avery, Robert D. Beatty and Judge Willis Vickery, was selected. After the hearing of testimony and arguments, the arbitrators ordered an increase to 27 cents per hour during the first year of service and 30 cents per hour during the second and subsequent years. In the hearing your officers exerted their best efforts to show that the increase asked was not warranted, but their arguments were only partially successful.

"Realizing that the increase in wages thus authorized would make it impossible for the company to operate its road for 11½ cents per car mile, your officers made application to the City Council in June for an increase of the allowance. Their request was refused. The cost of operation since the change in rates of wages confirms the statement we made in June that an increase in the operating expense allowance would be needed, and we are hopeful that the Council will now grant the request. If it does not, the question will have to be submitted to arbitration, as provided in the ordinance.

"Soon after the property was restored to the company the directors offered for sale, first to you and then to the public, about $1,500,000 of stock, at the minimum price fixed in the ordinance, namely, par and interest. Under this offer the company had received, to the end of the year, $386,200.

"Being unable by the sale of stock to raise the money needed for improvements, the company borrowed from the banks of the city sums that raised the floating indebtedness to $1,222,500.

"We have conferred with bankers and financiers, in Cleveland and elsewhere, with a view to interesting them in the stock of the company. We have tried to ascertain from them also upon what terms and to what amount an issue of bonds could be floated. These conferences led to a careful examination of the company's franchise by them and their attorneys. It is not surprising that in a document so long and so full of detail some imperfections and inaccuracies of expression should develop. N. W. Harris & Company, New York, bond dealers and leading authorities on street-railway finances, stated to us that, in their opinion, the company should be in a position to finance by the sale of stock as well as by the sale of bonds, and, this being so, that the investment in stock, as well as that in bonds, should be amply protected by the company's franchises; that investors in new stock of the company could not be sure of the full return of their principal, because, first, the ordinance failed to provide a sinking fund for the retirement of Judge Tayler's valuation of the old franchises, which

valuation was included by him in the company's capitalization, and, secondly, because the ordinance seemed to permit the company to maintain newly acquired property at a value only equal to 70 per cent of its cost, and to provide no sinking fund to take care of the 30 per cent depreciation that it was assumed the property would suffer.

"These suggestions have made it still more difficult to sell stock. Your directors, while believing that the property can for the present, under the ordinance, earn interest upon the bonds, floating debt and capital stock, are unable, in view of these criticisms of the ordinance, to assure investors that their stock will at all times, and especially at the end of the grant, be intrinsically worth par.

"In the hearing before Judge Tayler it was publicly stated, both by Mayor Johnson, representing the city, and by Mr. Andrews, representing the company, that it would be more desirable to raise money for extensions, additions and permanent improvements by the sale of stock than by the sale of bonds, both believing and stating that it would be better for the city to have the ownership of the property remain in Cleveland than to have it go to New York or New England, as it probably would do if bonds were sold for future improvements.

"It is for these, among many, reasons that we have attempted persistently to sell stock, rather than to mortgage the property of the company to secure the payment of additional bonds.

"If the ordinance does not protect the additional capital that the company needs, then an increase of the bonded indebtedness would decrease the equity and value of each share of stock, in case of a sale of the property at an appraised price at the end of the grant.

"Under these circumstances, we addressed a communication to the City Council, the Mayor and the City Street Railroad Commissioner, suggesting a conference with them or their representatives to see whether amendments to the ordinance could not be agreed to that, while safeguarding the city's interest in every way, would so express Judge Tayler's intention of protecting the investment in the property as to make it possible for us to finance by the sale of stock, or, if not, then by the sale of bonds at a lower rate of interest than would probably be asked if the ordinance were not amended. The city administration has so far declined to confer with us on this subject, saying that our needs for two or three years can and should be met by the sale of bonds.

"Because of the necessity of refunding next year the present bonds, the desirability of taking care of the floating indebtedness in a more permanent way than by promissory notes, and for the purpose of meeting the urgent needs of the company for additional power and equipment to take care of the large increase in travel that is surely coming with the certain growth of Cleveland, the directors submit for your consideration the resolution that was embodied in the notice of this meeting. If you adopt the resolution, it will not mean that the bonded debt of the company will be increased immediately, or in the near future, to $35,000,000. Bonds to the amount of $3,151,000 will be due Jan. 1 next and outstanding bonds to the amount of $5,000,000 mature on March 1, 1913. These bonds must be provided for at their maturity, and this can undoubtedly best be done by an issue of refunding bonds. In addition to these outstanding bonds, the floating debt of the company should be provided for and funds for necessary betterments raised.

"The present outstanding capital stock of the company is about $15,000,000; the bonded and floating debt amounts to about $9,400,000. We may lawfully issue about $5,600,000 of additional bonds, therefore, before the capital stock is increased. But when the amount of the bonded debt equals the amount of the stock outstanding it is our understanding that additional stock must be sold before more bonds can be disposed of, and, as, the ordinance fixes the minimum price of the stock at par, it will be necessary then, if not before, that the franchise be so amended that stock may be sold."

Mr. Stanley then gives the correspondence with the city on this subject. Most of this correspondence was published in the issues of the ELECTRIC RAILWAY JOURNAL for Jan. 7, 14 and 21, 1911.

The directors of the company were re-elected. The board consists now, as it did last year, of Horace E. Andrews, C. F. Emery, L. C. Hanna, R. A. Harman, Samuel Mather, H. P. McIntosh, W. C. Rhodes, Thomas P. Schmidt, John J. Stanley and J. H. Wade. At a meeting of the directors following the stockholders' meeting, John J. Stanley was elected president and general manager, C. F. Emery and R. A. Harman vice-presidents and H. J. Davies secretary and treasurer.

This resolution was adopted by a vote of 104,593 shares:

"Resolved, by the stockholders of the Cleveland Railway Company, that consent is hereby given to the issue by the Cleveland Railway Company of an amount of bonds not exceeding $35,000,000, and that the board of directors of the Cleveland Railway Company be, and said board is hereby, authorized to do all acts and things in its judgment necessary or proper to authorize an issue of bonds, said bonds to bear interest at a rate not exceeding 6 per cent per annum, payable semi-annually, to be dated and to mature at such times, and to be secured, issued and disposed of on such terms and conditions and at such prices as the board of directors may determine, and as the necessities of the company may require, as the same shall be determined from time to time by the board of directors."

BROWN BOOK OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

The 1911 "Brown Book" of the Central Electric Railway Association and the Central Electric Traffic Association has been issued from the office of the secretary-treasurer, A. L. Neereamer, Indianapolis. This publication contains an official list of the officers, railroad members, committees, annual reports, etc. The dates of the meetings during the coming year are given as follows: March 23, May 25, Sept. 21 and Nov. 23. The next annual meeting and election will be held on Jan. 23, 1912. The report shows a membership of 46 interurban railways aggregating 3480 miles of track and one city railway with 34 miles of track. Practically all of the information now gathered in the "Brown Book" in convenient form has been published in previous issues of the ELECTRIC RAILWAY JOURNAL during the past year, with the exception of committee appointments for the Central Electric Railway and the Central Electric Traffic Associations for the year 1911, which are published elsewhere in this issue.

TRAFFIC ASSOCIATION PROPOSED FOR ILLINOIS ELECTRIC RAILWAYS

Steps were taken at the meeting held in Chicago, Ill., on Jan. 28, 1911, to form a traffic association as an auxiliary to the Illinois Electric Railways Association, which will meet in Chicago on Feb. 17, 1911, to organize permanently. It is proposed at this meeting of the Illinois Electric Railways Association to organize a traffic association among the employees of the electric railways which become members of the Illinois Electric Railways Association, and Robert A. Barnett, special agent of the Chicago & Southern Traction Company, has been appointed temporary secretary of the Illinois Electric Traffic Association to issue a letter to the electric railways in Illinois, requesting the presence of their traffic managers at the next meeting of the Illinois Electric Railways Association. At the meeting in Chicago at which the plan to organize a traffic association was discussed Richard Breckinridge, general freight and passenger agent of the Aurora, Elgin & Chicago Railway; W. C. Woodward, traffic manager of the Chicago, Lake Shore & South Bend Railway; W. A. Russell, superintendent of the Elgin & Belvidere Electric Company; C. C. Shockley, general express and passenger agent of the Rockford & Interurban Railway, and Robert A. Barnett were present.

AUTOMATIC BLOCK SIGNALS FOR ELECTRIC RAILWAYS *

BY W. K. HOWE, CHIEF ENGINEER, GENERAL RAILWAY SIGNAL COMPANY

In view of the fact that the operating problems of interurban electric railways are comparable in many respects with those of steam roads, it seems fitting that the principles which are employed on steam roads in the operation of trains, and which have been found by long experience to be safe and reliable, should have careful consideration by the managements of interurban roads. The controlled space interval is rapidly superseding the indefinite and uncontrollable time interval method. The space interval method, as its name suggests, consists in maintaining a definite space or distance between trains and is commonly known as the block system. The block systems in use may be divided into three classes, the manual block, the controlled manual block and the automatic block.

The manual block system is one in which trains are controlled by signals operated manually upon information by telegraph, telephone or electric bells. It consists of a series of sections of track or blocks with a block station at the entrance to each section at which there are placed signals to be used by the attendant operator or blockman to control trains entering and occupying the block. Information concerning the condition of a given block is obtained by communication between the operators at both ends of the block. All of the block station operators in a given district are under the general supervision of a train dispatcher, from whom orders are received governing the irregular movement of trains, etc. The safety of operation under the manual block system depends upon the accuracy with which orders are received and transmitted, there being no check, either electrical or mechanical, to prevent the display of a wrong signal. Errors in receiving or transmitting orders or information relating to block operation have resulted in some very serious accidents. While many thousands of miles of single-track steam railroad are to-day being operated under the manual system with fairly satisfactory results, this system is out of the question on electric roads on account of the comparatively great number of passing points and the consequent expense were operators to be maintained at such points. Furthermore, there remains the entire dependence upon the human element which is greatly reduced in other systems.

The controlled manual block system is the same as the manual block except that the signals at the ends of each block are electrically interconnected in such a manner that co-operation of the signalmen at both ends of the block is required to display a clear signal. The co-operation referred to is the physical moving of certain levers in a predetermined manner and is in addition to, and affords a valuable check on, co-operation by communication only as in the manual system. It is a great improvement over the manual system, but still does not prevent two operators from making simultaneous errors. This latter fault is overcome by the use of a continuous track circuit so arranged that a train having entered a block will automatically set the proper signals to stop and hold them in that position until it is entirely out of the section, regardless of any attempt on the part of the operators to clear them. The controlled manual system has been largely used on steam roads and is regarded as a safe and flexible method of handling trains, especially on single-track lines with a mixed traffic. Its use on many electric lines is prohibited on account of the large expense involved in maintaining operators at so many points.

Another form of controlled manual block system is the so-called staff, tablet or token system, which has been applied only to single-track lines. In its operation no train is allowed to occupy a block section without the possession of a tangible object or token such as a staff, ball or tablet. The tokens are obtained from instruments located at the opposite ends of each block, which are so interconnected electrically that but one token can be removed at a time and until this one has been deposited in one of the two instruments no other token can be withdrawn from either instrument. As but one token can be removed from the pair of interconnected instruments at one time and as the possession of a token is the only authority to enter a block, it is evident that there can be but one train in a section at a time, except where permissive blocking is permitted, in which case the tokens are made in pieces, each of several following trains taking part of a token and the last train taking all that remains. When this divided token is put together and deposited in the instrument at the outgoing end of the block another token can be withdrawn from either instrument. The strong feature claimed for this form of controlled manual blocking is that it requires the train crew to take part in the operation and gives the engineman tangible evidence of his right to occupy the block. Its drawbacks are that thus far it has required the train to stop to deposit and withdraw the tokens or else requires operators at each passing point to receive and deliver them to the crews of passing cars.

The use of this system has made very slow progress, as shown by the fact that up to Jan. 1, 1910, only 270 miles of railroad were being operated by it in the United States. It cannot be considered the equivalent of any system using a continuous track circuit for the reason that a train can enter a block without a token and not indicate its presence to an opposing train, whereas with a track circuit system a train cannot enter a block without doing so. Furthermore broken or removed rails or a car in or fouling the block cannot be indicated by the staff without the track circuit. It is believed, therefore, that this system as it stands to-day is not well adapted to high-speed electric traction. It may be applicable where station stops can be made coincident with passing points, although even under such conditions if the car must slow down or stop to obtain its authority to enter a block it would be possible to use miniature block signals, which could be made very inexpensive.

Still another method of controlling trains, although not a block system, is the dispatcher's signal system in which signals located at the passing points are under the direct control of the train dispatcher and are used to stop trains for the purpose of issuing orders over the telephone. With modern selective systems signals of this kind can be operated with a high degree of accuracy and be made to give a return indication that the desired signal has been set. They have not been successful, however, in all cases and the dispatcher has no check on the trains. He cannot be absolutely sure that a train has not passed by the signal he proposes to set unless the trains are required to stop at every signal, which would be out of the question on most lines on account of the delay occasioned thereby. The liability of changing a signal from clear to stop in the face of a high-speed train is undesirable. Even though these defects could all be overcome there still remains the objection to any purely manual system that safety depends on human agency alone. Any error in transmitting or receiving orders may result in an accident. It would not seem advisable to depend entirely on such a system except as supplementary to an automatic block system for the purpose of stopping trains to give them orders.

In the automatic block system signals govern the entrance to each block. The signals are automatically controlled by the trains as they proceed in such manner that complete head-on and rear-end protection is afforded. Different forms of the automatic block system have been and are being used. The essential differences between them lie in the manner in which the control of the signals by the train is effected. The wheel contact method, using the so-called track instrument, was at one time used by some of the steam roads, but later abandoned in favor of track circuit control. Trolley contacts are being used by a number of electric lines at the present time with more or less success. Short track circuits at the entrance to each block have also been used. The continuous track circuit is the only method embodying the fundamental principle of a car or train controlling at all times the signals governing the specific section of track occupied. There are in the United

*Abstract of a paper presented at a conference called by the Public Service Commission, Second District, New York, Syracuse, Jan. 19, 1911.

States over 17,000 miles of railroad protected by continuous track circuit signals, and during the year 1910 an increase of over 3000 miles was made in automatic block signaling as against about 450 miles of all other forms. In some instances roads have abandoned older forms of signaling for the automatic block. This is adequate testimony as to the safety and reliability of the continuous track circuit method of signal control.

Some of the advantages of the automatic block signal system using track circuit control as applied to interurban lines are as follows:

No operators are required at passing points; hence it is comparatively inexpensive to operate.

Trains are not required to stop or even slow up to find out whether they can enter the next block.

It does not place dependence for safety on human agency alone.

The certainty with which signals are given is independent of the train speed.

The proper signals will indicate stop under any of the following conditions: A train or a car of any description anywhere

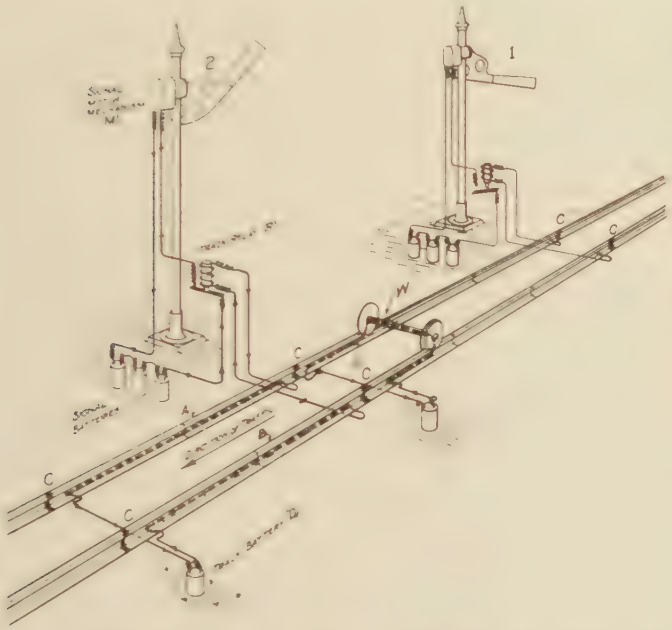


Fig. 1—Automatic Block Signals—Diagram of Track and Signal Circuits Using Batteries

in the block or fouling it, an open switch or drawspan, a broken or removed rail or any failure of the power or the breaking or crossing of the connecting wires.

The main objection to automatic signaling for many electric lines has been the high initial cost. However, certain of the signal companies have for some time been at work on the problem with a view of devising methods and apparatus which, while maintaining the same degree of safety and reliability that is found on the steam roads, are much less expensive. Automatic block systems employing the track circuit are now available at a cost which should appeal strongly to the managements of many of the electric roads. The continuous track circuit automatic block system is confidently recommended to electric railways as the best known means of providing for the safe and expeditious operation of trains.

The track circuit, as its name indicates, is nothing more than an electric circuit of which the track rails are made to form a part. Fig. 1 shows in perspective a section of railroad track with two signals numbered 1 and 2 and with the necessary batteries, relays, etc., required for their control. Each rail is electrically separated by insulating rail joints *CC*, placed opposite each signal and also opposite track battery *D*. These are for the purpose of dividing the track into electrically independent sections. A track battery at *D* is connected by wires to the rails at one end of each section and the coil of a relay *R* to the rails at the other end. The secondary electric circuit is shown complete, leading from a set of signal batteries through the track relay armature and the signal motor mechanism *M*. The pair of wheels *W* represents a train. Owing to the presence of the wheels the relay for signal 1 is short-circuited and the armature contacts held open, with the result that no current can flow from the signal batteries into the motor mechanism for that signal; therefore, the semaphore will drop by gravity to its horizontal or danger position, indicating to a following train that the train *W* is in the block ahead. There being no train in the block ahead of *W* the relay for that section will receive current through the rails from battery *D*, which will cause its armature to close the motor circuit. This in turn will cause the motor to rotate, moving the semaphore arm to the "clear" or "proceed" position as shown, thereby indicating to train *W* that the block ahead is clear. By means of the continuous track circuit and signals controlled thereby the trains automatically protect themselves, putting signal after signal at stop and allowing each signal to move to the clear position only after the train has proceeded into another block under the protection of another signal.

Signals are frequently controlled not only by their own immediate track circuit, but by others in advance by means of line wires running from one signal to the next and broken through separate contacts on the track relays of the various sections involved. A signal may also be controlled by another signal in advance over line wires in such way that its semaphore cannot move to the vertical position indicating proceed until the signal in advance has moved to the inclined or 45-deg. position indicating caution. Thus one signal can give advance information to an approaching train of the condition of the next signal beyond. An endless variety of combinations of this kind can be made to suit varying needs. Signals can be spaced any distance apart up to several miles and still have continuous track circuit control. If they are too far apart for one track circuit two or more may be employed, one controlling the other in such way that the signal will be held at stop till the train has left the last track circuit in the series. When two or more track circuits are employed in this way they are spoken of as "cut sections."

Fig. 1 shows the rails divided into sections by insulating joints in such manner that they cannot serve as a return for the propulsion current. To provide for this and at the same time keep the various block sections electrically independent for signaling purposes reactance bonds *TT* are used, connected across the rails and to each other as shown in Fig. 2. These reactance bonds consists of a few turns of a very heavy copper wire wound around a mass of laminated iron, something like the construction of a transformer. When connected as shown in Fig. 2 the return propulsion current flowing through both rails in the same direction passes through the bonds in such manner as to have no magnetic effect on the iron core, whereas the alternating current, which is used in place of the track battery current, encounters a comparatively high resistance. This causes some of the current to flow through the track relay, which is connected across the rails exactly as in Fig. 1. A track winding on a transformer is connected across the rails at the other end of the track section to supply the alternating signal current in place of the track battery shown in Fig. 1. Track circuits of this type, due to various improvements which have been made, can now be operated up to lengths of 2 miles without cut sections and with reasonable energy consumption where the ballast is good. Under like conditions, by feeding energy in at the center of the section and using a relay at each end, track circuits approximately 5 miles long can be operated. Track circuits of this kind are known as center-fed circuits. The effect of the condition of the track ballast on the permissible length of end-fed track circuits is very marked. With poor ballast such as occurs when the rails are buried in wet earth or when wet cinders are brought up around the base of the rail the permissible length of track circuit is roughly 6000 ft. With medium ballast such as wet gravel, etc., the length is about 8000 ft. and with good rock ballast kept away from the base

of the rail, even when wet, the track circuits can be upward of 10,500 ft. in length.

In calculating the length of track circuits the worst conditions must always be considered, viz., when the ballast is soaked after a continued rain. The figures given above, of course, are only approximate, as conditions will vary widely, depending on the size of rail, amount and nature of propulsion current, frequency of the alternating signal current, etc. The figures given are based on 80-lb. rail using a signaling current of 25 cycles.

On account of the greater amount of power available and the absence of all batteries, track circuits operated by alternating current are even more reliable and require less attention than the battery-operated track circuits on steam roads. Any condition of the bonding that would be tolerated from a traction standpoint is good enough for the operation of signals. What to a traction return would be equivalent to an open circuit would not be noticeable in a track circuit. Reports received from a number of electric traction signal systems covering a number of years show very little trouble due to this cause. In view of the fact that alternating current must be used for the track circuits and hence a transmission line must be used to distribute the current to the track transformers, the various signals, relays, signal lights, switch lights, etc., can also be operated from the same source, thus avoiding all batteries and reducing the operating charges to a minimum.

On electric lines using alternating current for propulsion a signaling current having a different characteristic from that of the propulsion current is used and relays are provided which are responsive only to such signaling current and not to the traction current. The cost of such a system would be somewhat higher than with direct current propulsion on account of the greater number of cut sections that would have to be employed. It is possible to operate track circuits where a. c. propulsion is used by employing ordinary direct-current batteries. In such event one of the rails would have to be abandoned for the return propulsion current and used for signaling only, the other rail being continuous for the propulsion current return. It is believed to be inadvisable, however, to attempt the use of battery-operated track circuits on alternating current lines because of the danger of false indications due to the flow of stray direct current through the track rails.

The proper indications of signals form an important part of the problem of signaling. Block signals may be divided into two general classes, viz, absolute and permissive. Absolute signals ("stop and stay") are those which normally permit but one train in a block at a time except by special permission such as an order from the dispatcher. Permissive signals ("stop and proceed") are those which normally permit trains to follow each other into the same block under certain prescribed rules. Absolute signals are used to govern the entrance to a piece of single track, which of course could not be used by trains in the opposite direction at the same time. Permissive signals are used to govern the movement of trains following each other.

Figs. 3 to 9, inclusive, show a series of day and night indications in which an arm in the horizontal position or a red light always means stop; the arm inclined upward at an angle of 45 deg. or a yellow light displayed above a white light always means proceed at normal speed prepared to stop at the next signal, and a blade in the vertical position or a green light always means proceed at normal speed prepared to pass the next signal at normal speed. Furthermore, a yellow light displayed below a white light, Fig. 9, gives authority to proceed into an occupied block and is named a "call on signal." The white light next below the semaphore is used as a marker to show whether a signal is absolute or permissive. Lights in a vertical line indicate an absolute signal, as shown in Fig. 3, and when staggered, as shown in Fig. 4, indicate a permissive signal.

In planning this series of indications it was the aim to have as few and as simple indications as possible, always having each arrangement of arms or lights indicate only one and the same thing, so that the motormen could easily learn and remember what they mean and could comprehend their meaning in an instant when the signals were seen. The system of signal indications shown is the result of a prolonged and careful study of the subject made by prominent members of the Railway Signal Association. It is a safe, uniform and consistent scheme and will meet practically all of the conditions to be encountered in automatic block signaling on electric lines. It is worthy of careful consideration by those having such matters in charge.

Light signals corresponding as regards their day and night indications to the light indications of Figs. 3 to 9 can also be used. By the use of large and powerful lenses and reflectors and by providing suitable hoods over each light they can be seen clearly at a distance of several hundred feet in the bright sunlight and of course very much further at night. They are recommended where the speeds are moderate or where the trains slow up at all sidings. They are very simple and inexpensive as compared with semaphore signals, the only objection to them being that they cannot be seen so far in the daytime. Their use for electric railway signaling is more justifiable than in steam road signaling. Light signals have the advantage as compared with semaphores in that there are no exposed moving parts to be interfered with by sleet, ice or broken wires.

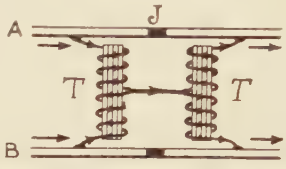


Fig. 2—Automatic Block Signals—Connections for Reactance Bonds

In the location and control of signals for single-track operation several points must be considered; first, with respect to intermediate sections of track and, second, with respect to passing points. Each section of single track should be protected by absolute starting signals, one placed at each entrance thereto and so controlled that two trains approaching from opposite directions can never both get clear signals and proceed into the same block at once. This is accomplished by "overlapping" one signal by the other, that is to say, by having the control of one signal extend beyond that of the other. Before a proceed signal can be given into a piece of single track the opposing signal should be required to be at stop. This can be guaranteed by electrically interlocking opposing signals and by so designing the circuits and apparatus that no breaks or crosses between the line wires controlling such signals can by any possibility cause the opposing signals, which should be at stop, either to remain in or be moved to the proceed position. This can be accomplished in a very simple manner.

With regard to the arrangement of signals at passing points, it must be recognized that as conditions are at present there is a great difference between steam road and interurban electric railway practice as regards the weight, speed and make-up of the trains moved and hence as regards the braking distances which can be depended upon. For equal safety electric lines operating practically uniform equipments can dispense with some of the provisions necessary on steam roads. On single-track lines various arrangements at passing points are used, namely, the distant signal, staggered signals, siding signs or a combination of such schemes.

To take care of certain situations, signals on single-track roads frequently are staggered, that is to say, opposing signals are placed at a certain distance from each other. In this arrangement approaching trains stopping at their signals will have a predetermined space between them. The need for this separation becomes less as speeds become less and the equipment becomes more uniform and lighter and therefore the braking distance shorter and more uniform. It also becomes less as the distance at which a signal can be clearly distinguished is greater than the braking distance or when distant signals or fixed siding signs are used to indicate the approach to and the condition of the signal at the point of danger. The siding sign indicates to a motorman that he is approaching a danger point and must be on the lookout to see that the switches

are properly set and no other trains are in the way. Siding signs are frequently set 2000 ft. in advance of the point of danger, on a level with the headlight and close to the track, and are very large and conspicuous. There is therefore very little chance that siding signs will be missed. A distant signal is both a siding sign and a means of giving advance information as to the conditions at the point of danger. It is a time saver, especially in bad or foggy weather, and is very useful where the view of the home signal is obscured by a non-removable obstruction. Distant signals, if used, should be fully automatic, that is, they should go to stop behind a train and remain so until the train is under the protection of the next signal in advance. To make a distant signal fully automatic a track circuit must be used. The larger and more conspicuous the home signal is made the less the need for a distant signal, especially where siding signs are used.

It is evident that any degree of protection desired can be given and that the protection required depends largely on the braking distance. As the requirements become more severe the expense will go up. For moderate speeds or when traffic conditions permit slowing up on the approach to each passing point the simple scheme of using light signals opposite each other with siding signs will be found satisfactory and is the least expensive. It should be remembered that a starting signal permitting entrance into a given piece of single track, when clear, tells the motorman that the block is clear and that it is safe for him to proceed to the next signal only. He must approach the next signal prepared to stop short of it. If upon approaching this signal at high speed he is unable to distinguish the indication he must apply the brakes and continue under control until the indication of the signal which he is approaching is visible. With a full-size semaphore in moderately clear weather either day or night and when the view is unobstructed the motorman of a high-speed electric car will be able to sight the signal in plenty of time to stop if the signal is at danger. It is necessary to slow down, when the signal is clear, only in foggy weather. With light signals high-speed cars would have to slow down in all kinds of weather; hence such signals are only recommended where the speeds are moderate, say about 30 m.p.h.

In view of the foregoing it is believed that on many electric lines it is neither necessary to stagger the home signals or use distant signals where the view of the home signal is unobstructed, where siding signs are used and where a full-sized semaphore is employed. If the locality is such that much bad weather occurs, or if the view of the home signal is obstructed by a curve, or if for any reason the view of the home signal is often obstructed, it would be economical to use distant signals. The arrangement of signals at passing points also is largely influenced by the nature of the siding. For stub end or short passing sidings two signals, with or without distant signals, will generally be found sufficient, but where long passing sidings are employed four signals, with or without distant signals, should be used. The practice employed by some roads of requiring cars to head in and back out is to be heartily commended from the standpoint of safety, insuring as it does the setting of the switch in the main line position. Wherever spurs or sidings exist other than at regular passing points they should be protected by switch indicators so arranged that they will show whenever it is safe for a car to leave such a siding; and when the switch is thrown the proper signals should be set at stop, indicating to any other train which may be approaching that the block is occupied. Furthermore, the proper signals at passing points should be controlled by the switches in such a manner that they will give the proper danger indications when the switches are opened.

An important consideration in determining the number and arrangement of signals is the cost of stopping or slowing down high-speed trains in order to ascertain whether or not the next block is clear. Systems initially less expensive than the track circuit system may be employed where trains are required to slow down or stop at all passing points, but it is a question if their use can be justified, especially on high-speed lines, in view of the higher operating costs, loss of time, etc. Based upon information furnished by an officer of one of the large interurban lines of the country, it was found that the cost to stop and start an ordinary 40-ton car, running at 40 m.p.h., including power, wear and tear on the brake shoes, brake rigging and trucks, is approximately 3 cents per stop, based on a cost of power of 1¼ cents per kw-hour. Assuming a movement of 20 trains a day in each direction the cost per day at one passing point would be $1.20 and per year $438, which would pay the interest on an investment of $8,750. For higher speeds and greater car weights this would be more, and for slower speeds less; also, if the train did not come to a full stop it would be less. If these figures are anywhere near correct it shows conclusively that any system in which trains have to stop frequently for the sake of getting indications is a poor investment. Not only is stopping expensive, but it involves a loss of time. In the case cited above about one minute was lost per stop. Where a road gives limited service and where there are many sidings and only a few stops for the limited train it would be a serious handicap to stop or even slow up at the various passing points.

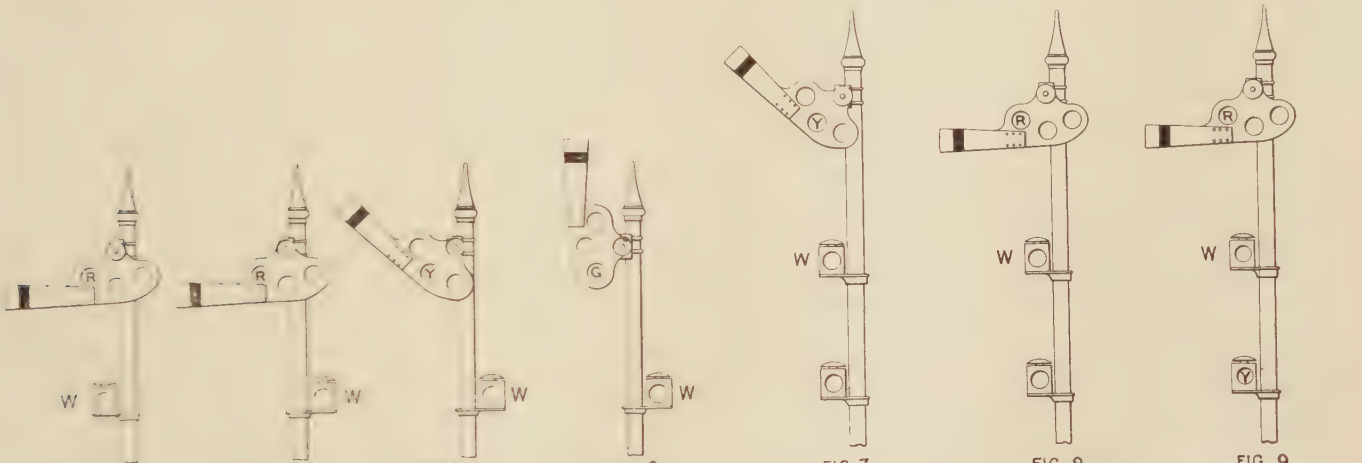


FIG. 3 STOP AND STAY

FIG. 4 STOP AND PROCEED

FIG. 5 PROCEED AT NORMAL SPEED PREPARED TO STOP AT NEXT SIGNAL

FIG. 6 PROCEED AT NORMAL SPEED PREPARED TO PASS NEXT SIGNAL AT NORMAL SPEED

FIG. 7 PROCEED AT NORMAL SPEED PREPARED TO STOP AT NEXT SIGNAL

FIG. 8 STOP AND STAY

FIG. 9 PROCEED BLOCK OCCUPIED

Figs. 3 to 9—Automatic Block Signals—Recommended Semaphore and Light Signal Indications

[The writer then gave a series of cuts, which are not reproduced here, illustrating various arrangements of signals to meet different classes of traffic, with a full description of each arrangement, especial attention being directed to a system which will allow close following movements under a distinctive signal with absolute head-on protection using the track circuit

as the medium of control and without the use of intermediate signals.]

The statement is sometimes made that trainmen will not obey signals and therefore their use is not justified. While it is true that trainmen have in many instances disregarded signals, it by no means proves that their use is not justified. The disregard of signals has been due largely to their improper location or operation. For example, signals have frequently been allowed to be at stop when they ought to have been at clear, which has led to their disregard, and which in turn has resulted in some very serious accidents. Another important point in securing obedience to signals is to locate them properly. For example, if a distant signal is set too far away the motorman will soon find out that he need not shut off and apply brakes when he passes it, for if he does he will lose time and he soon learns that he can just as well apply them later and stop in time. He may under such conditions do it too late. Cases have also come to the writer's attention where, due to misplaced signals, trains were regularly delayed when they need not have been; hence the tendency on the part of the engineer or motorman to disregard the signals. In short, whatever disobedience there may have been to signals is largely due, in the opinion of the writer, to faulty apparatus, misplaced signals or faulty practices in their operation. With up-to-date systems and mechanisms, together with a better understanding of traffic requirements, the operation goes on with surprising accuracy with the result that the causes leading to the disobedience to signals have been very greatly reduced.

Some of the reasons which may justify an electric line in spending the money necessary to install proper signals are:

Increased capacity of the line, reduced liability to accident, avoidance of delays and increased confidence of the traveling public. With strong line construction a properly designed signal system will give much less trouble than a telephone system with its delicate apparatus, thus making it possible to operate with comparative freedom with the telephone line in trouble. The telephone should not be abandoned, however, as it is a very valuable adjunct in the handling of trains on single track. A suitable signal system will permit schedules to be maintained safely in all kinds of weather, which is an important consideration in sections of the country where there is much foggy weather and the like.

AUTOMATIC STOPS

There is a wide difference of opinion on the subject of automatic stops, some claiming that automatic stops will have a tendency to make motormen relax in vigilance and others that they will have the opposite effect. If automatic stops are used in interurban service they should record every time they operate and the motorman should account for each record. Under these conditions no relaxation in vigilance would result. Stops, if used, should be so connected with the air system that an emergency application will not result when the trips are caused to operate. This will frequently require the use of auxiliary air-controlling apparatus on the car. To make automatic stops of their highest value it frequently becomes necessary to rearrange the signals on single track to secure the necessary braking distance and when so rearranged the signal installation may become much more expensive. On double-track roads a full block overlap is usually provided. With this arrangement about 33 per cent more signals are needed than without stops to maintain the same headway.

In conclusion the writer wishes to emphasize the following points in this paper:

(1) Where the traffic conditions on electric railways are such as to require block signals the automatic system employing continuous track circuits is recommended. Its use is urged from the standpoint of safety, reliability and economy. It is now successfully employed on over 17,000 miles of steam road in this country and its use is rapidly increasing, to the exclusion of other block systems.

(2) Automatic block systems employing track circuits for electric lines are now available which, while maintaining a full degree of safety, reliability and economy, are much less expensive than ever before.

(3) Of the various systems of single-track signaling available the one in which opposing moves are controlled absolutely and following moves permissively under a distinctive signal is recommended for those roads where following moves closer than the distance between passing points are required.

(4) The adoption by the various electric railroads of the country of a uniform system of signal aspects and indications is urged. The system proposed by the Railway Signal Association, as far as it will apply and as described in this paper, is recommended.

REPORT ON SUBWAYS FOR CHICAGO

On Monday of this week Bion J. Arnold, chief subway engineer for the City of Chicago, submitted to Mayor Busse and the local transportation committee of the City Council a report on a proposed system of subways to be used as the basis for formulating a well-defined policy on the part of the city with regard to future extensions of rapid transit facilities in the congested loop district.

Mr. Arnold submitted two plans for future subway construction. The first plan contemplates the construction of a comprehensive system of high-speed subways designed ultimately to cover the entire city and make it possible to remove the present elevated structures in the downtown district. Such a system of subways would provide not only for the operation of high-speed express and local trains, but also for the operation on separate tracks of surface cars which could be deflected into the subways at outlying points and therefore greatly relieve the congestion on the surface of the streets. This plan contemplates using the subways to be built first for some of the present surface car lines; later the trains of the elevated roads and, finally, for high-speed subway trains, reaching far out into the residential districts. These subways could be built by the city or by private capital, or by calling upon the surface street railway systems for financial support. If the city decided to enforce the clause of the traction ordinances of 1907 under which the surface lines are operating, these lines could be required to furnish money toward the construction of the subways, provided that they had the full use of the subways so constructed up to the capacity which they required.

The second plan proposed by Mr. Arnold is for a system designed to be used exclusively by surface cars for the immediate relief of the present congestion on the streets in the business district. This plan would utilize the existing tunnels under the Chicago River and the routes and levels would be so located that there would be no interference with the subsequent construction of the high-speed subway system, as proposed in the first plan. Under this second plan the city could allow the surface lines to construct a subway system suitable only for surface cars with their own money, or call upon the surface lines for the money required to construct such a system and built it jointly with them or not, as might seem best.

Mr. Arnold strongly recommends the first plan. The general principles upon which the system he favors is based are as follows: (1) Through operation from north to south with as straight tracks as possible. (2) The construction of loop routes for the West Side lines which would encircle and cross the business district. These east and west subways would have the grades separated where they cross the north and south subways. (3) Subways under diagonal avenues leading to the northwest and southwest sections of the city. With such a system passengers from the West Side could be carried directly to the lake front without transferring, or by transferring once could take any of the north and south routes. Similarly, passengers from the North and South Sides could be carried from one end of the city to the other without transferring, or by transferring once they could reach any point on the West Side of the city.

The construction of subways in Chicago is somewhat

hampered by the fact that 33 ft. below the surface of the streets the Illinois Tunnel Company has constructed a system of nearly 60 miles of freight tunnels which cannot be disturbed. This would necessitate very shallow construction for the new subways, especially at street intersections where the north and south lines cross the east and west lines on two levels. Mr. Arnold proposes the use of combination I-beams and reinforced concrete construction for the new subways so as to permit cross-sections of sufficient size to admit the present standard elevated cars in the tunnels within the narrow limits of depth. Sufficient space would be left at the sides of the tunnels to permit building pipe galleries which would accommodate all of the subterranean structures of the various public utility companies. Special attention is given in the report to the subject of the disposition of the sewers. The sewers will either be constructed in the streets not wholly occupied by the high-level subways or in special galleries which will form a part of the high-level structures. It is proposed to provide for ventilation of the tunnels by having the bore of each track inclosed, except at stations, so as to produce a piston action by the movement of trains.

The report outlines the progressive steps in the construction of the complete system. The first step would be to relieve the congestion on Clark Street, which at the present time is most in need of such relief. The plan would be to construct a two-track subway from the present southerly portal of the La Salle Street tunnel under the Chicago River; south to Madison Street, east to Clark Street and thence south under Clark Street to a portal at Archer Avenue. The estimated cost of this section, which would include 4.28 miles of single track and four stations, is $3,000,000, exclusive of damages to property. The next step would be the construction of a terminal loop from the east entrance of the Washington Street tunnel under the Chicago River, via Franklin and Madison Streets, Michigan Avenue, Jackson Boulevard and Franklin Street back to the east entrance of the Washington Street tunnel and a similar loop under the same streets from the east entrance of the Van Buren Street tunnel. This route comprises 3.663 miles of single track and six stations, and the estimated cost, exclusive of damages to property, is $5,000,000. Subsequent extensions of the system would consist of routes substantially parallel to these. The total cost of the complete system comprised in the first plan as outlined in the report, comprising a total of 49.185 miles of single track and 44 stations, is estimated at $48,900,000. The cost of the complete system proposed in the second plan is estimated at $13,200,000 for 9.8 miles of single track and 11 stations.

The report is accompanied by a number of maps showing the successive stages of construction in each of the proposed plans and cross-sections at several different points, showing the shallow construction proposed and complete studies of station plans and other details.

STANDARD CLASSIFICATION OF STREET RAILWAY ACCOUNTS IN NEW JERSEY

The Board of Public Utility Commissioners of the State of New Jersey has adopted as a standard classification of accounts for the electric railways in its jurisdiction the standards of the American Electric Railway Accountants' Association, with two slight changes. One of these is in operating expenses account No. 26, "Depreciation of Way and Structures." The other is in operating expense account No. 42, "Depreciation of Equipment." As modified these read as follows:

"26. Depreciation of Way and Structures. Charge to this account, month by month, the amount estimated to be necessary to cover such wear and tear, obsolescence and inadequacy as have accrued during the month on all way and structures of the accounting corporation, less an amount equal to the sum of the amounts charged for that month to the various repair accounts in 'Maintenance of Way and Structures.'

"Note.—Until otherwise prescribed the 'amount estimated to be necessary to cover such wear and tear and obsolescence and inadequacy as have accrued during any month shall be based on a rule to be determined by the accounting corporation. Such rule may be derived from consideration of the said corporation's history and experience. A general statement of the rule in use by each company, together with the general information upon which it is based, is to be filed with the Board of Public Utility Commissioners."

"42. Depreciation of Equipment. Charge to this account, month by month, the amount estimated to be necessary to cover such wear and tear, obsolescence and inadequacy as have accrued during the month on all equipment, less an amount equal to the sum of the amounts charged for that month to the various repair accounts in 'Maintenance of Equipment.' See note under Account 26."

GOVERNORS' MESSAGES

The following abstracts from the messages of governors supplement those published in the ELECTRIC RAILWAY JOURNAL of Jan. 14, 1911, page 75; Jan. 21, 1911, page 125, and Feb. 4, 1911, page 229.

GOVERNOR EDWIN L. NORRIS OF MONTANA

The issuance of capital stock, an increase in stock or the creation of an indebtedness by corporations should not be allowed until some State authority has made an examination and become satisfied that the fair market value in money or property has been paid for stocks or bonds, except that a reasonable amount of promotion stock or premiums might be allowed for organization, promotion or sale purposes.

This duty might appropriately be performed by a public service commission, for the organization of which recommendations will be made. All realize that none but laws that deal justly with capital should be passed, but, upon the other hand, laws that will compel capital to deal justly with the public are insisted upon. I cannot believe that the enactment of any laws justly and fairly regulating corporations will prevent investments and development in Montana.

Public service commissions with full power to regulate will cut the taproot of corporate evils and bring about conditions that are fair alike to the corporations and the public. Many favor elective commissions, while others advocate appointive bodies. I am not so much concerned with the method of selection as I am impressed with the necessity for a public service commission.

GOVERNOR SPRY OF UTAH

In my message to the Legislature two years since I called attention to and made certain recommendations regarding the creation of a public service commission in the State of Utah, which I again present for your consideration, in part, as follows:

"The affairs of quasi-corporations and associations should have publicity. Intelligent investigation of combinations and public service corporations will greatly aid the people of Utah and tend to establish just and fair dealing.

"Whatever action is taken should be in the spirit of conservatism and fairness to both individuals and corporate interests, such as has characterized the past history of the State, and which will make for the public good.

"For the attainment of this end I recommend the creation of a public service commission, to be composed of citizens of ability to deal with matters of such weighty importance; the commission to be clothed with ample powers to make regulations necessary to conserve the public welfare in this regard. Such a commission should be entirely accessible to all of the people upon all of the subjects within its jurisdiction and the law be sufficiently broad to include every public utility operating within the State. The prompt adjustment upon an equitable and inexpensive basis of the many difficulties and complaints arising in this class of business should be provided for in creating a commission of this character, which thus would be beneficial to every interest involved. In fairness to all the people of this State the creation of a public service commission should not be longer delayed."

GOVERNOR J. M. CAREY OF WYOMING

I recommend to the Legislature that in all corporate organi-

zations under the laws of the State the right of cumulative voting in the selection of boards of directors of said companies be provided for. In other words, that the minority stockholders shall have representation upon these boards by pooling their stock if they so desire and electing at least one of the board.

GOVERNOR GEORGE W. DONAGHEY OF ARKANSAS

The fact that public service corporations are organized under our State laws and have home men on their boards of directors does not alter the real situation, for these home men are sometimes selected merely for their supposed local influence, while the real control is, of course, in the people who own the shares of stock in the corporation. That foreign capital is invested in them is no ground for complaint, but abuses in the management of these properties are permitted to grow up that would hardly exist if those in control were on the ground and able to know what was being done.

Under existing laws corporations operating street railroads have an undue advantage in their litigation. If a citizen from any part of the State is injured by a street car in Little Rock, Fort Smith, Pine Bluff, Hot Springs, Texarkana or Eureka Springs he is not permitted under the law to bring suit in his home county, but must sue in the county where the car line is operated. It is not fair to make the defendant go to the paintiff's county, nor is it fair to make the plaintiff go to the defendant's county for trial. Neither party to a suit should have any advantage over the other in the matter of the court where the case is to be tried. A law ought to be passed giving the plaintiff an absolute right to a change of venue merely upon his filing a petition, verified by himself, asking therefor in every case where it is necessary under the law to bring suit in the county where a corporation has its principal office in order to get legal service of summons in the action. It does not meet the case to say that the law already gives any party the right to a change of venue when he can show the court that the other has an undue influence in the county where the case is pending, for when the plaintiff, who is often a stranger in the county, undertakes to make this showing he is very apt to be met by the friends of the corporation willing, ready and eager to testify that he can get a fair trial. Not only should there be legislation to remedy the abuses here referred to, but it will be eminently proper to place all public service corporations under the jurisdiction and supervision of a commission with ample authority and power to make and enforce all reasonable rules and regulations governing their operations. If the financial condition of the State will not admit of the creation of such a commission at this time, the jurisdiction of the Railroad Commission should be so extended as to cover such matters.

Within the last decade the General Assembly of this State has enacted many beneficial laws for workingmen engaged in hazardous occupations to recover compensation for injuries sustained for which at common law there could be no recovery. The abolition of the fellow-servant rule has been a step in the right direction. But I am of the opinion that the time has arrived to take another forward step and provide by legislation for compulsory compensation for industrial accidents, regardless of the rules of the common law known as assumption of risks and contributory negligence. For the latter I would recommend to your honorable body the enactment of a law based on what is known as comparative negligence, and in addition to these I would recommend to your favorable consideration a compulsory compensation law providing in all cases of injury to an employee, unless it is caused by his own wilful act, compensation based on his earnings. If the injury results in death, a sum equal to the earnings of a certain number of years should be paid to the family of the deceased dependent upon him for support, and a similar proviso should be made for him in case of permanent or temporary disabilities. At present the burden is placed entirely on the shoulders of the workingmen, those least able to bear it.

GOVERNOR EMMET O'NEAL OF ALABAMA

My views on this important question are so fully and clearly expressed by the Democratic platform adopted on May 17, 1910, that I quote it in full:

"The public has a right to require from public service corporations just and impartial service, without rebates, discriminations or exactions, and an efficient and courteous performance of their duties. Such corporations, on the other hand, are entitled to just and fair treatment and to equal protection of the law, and capital invested in such enterprises should not be denied the opportunity of earning just and reasonable compensation. We favor legislation which will safeguard the rights of the public as against such corporations, but condemn any legislative attempts to cripple such corporations by enactments which are harsh or inspired by a spirit of hostility."

I would suggest that the powers of the present Railroad Commission be so enlarged as to embrace telephone and telegraph companies with full power, after hearing, to adjust and regulate intrastate rates.

GOVERNOR HIRAM W. JOHNSON OF CALIFORNIA

The people are, indeed, fortunate now in having a Railroad Commission of ability, integrity, energy and courage. I suggest to you, and I recommend, that you give to the commission the amplest power that can be conferred upon it. The president of the Railroad Commission, John M. Eshleman, in conjunction with Attorney-General Webb, Senator Stetson and others, in all of whom we have the highest confidence, has been at work preparing a bill which shall meet the requirements of the case, and I commend to your particular attention this instrument.

I would suggest that an appropriation of at least $75,000 be made for the use of the commission that it may, by careful hearing and the taking of evidence, determine the physical value of the transportation companies in the State of California, and that the commission may have the power and the means to determine this physical value justly and fairly, and thereafter ascertain the value of improvements, betterments and the like, and upon the values thus determined may fix the railroad rates within the State of California.

GOVERNOR OSWALD WEST OF OREGON

The four years' work of the Railroad Commission speaks for itself. Since the creation of the commission the public has seen a marked improvement in the roadbed, equipment, station facilities and train service of our railroads and is receiving the benefit of an annual saving of several hundred thousand dollars through rate reductions. The great task of ascertaining the original cost and cost of reproduction of all of the railroads in the State is about finished and the information thus obtained will be of inestimable value both for taxation and rate-making purposes. This undertaking has cost the State but a small fraction of what similar undertakings have cost other States. The commission is now working under a very effective law and but few amendments are necessary. These, however, will be submitted to you for your approval through measures which are being prepared by the commission. Its further needs are fully set out in its annual report and will no doubt be called to your attention by the members of the commission.

There is a demand from many quarters for the better regulation of all public service corporations and a movement is now on foot to place those not now subject to control under the jurisdiction of some commission. Experience has shown that just rates and treatment come only through such effective regulation and there is no excuse for further delaying action in this State.

The constant consolidation and reorganization of our public service corporations and the lack of proper regulation in the matter of issuing stock should attract the attention of the members of this Legislature and convince them that there is great need of legislation which will protect the public from all unwarranted issues of watered stock. It may be that this is a matter for federal regulation, but in the absence of any action on the part of Congress it is surely within the province of the State to take action in the matter.

Bridge plaza and out as far as Jackson Avenue, there looping to the south side of the plaza and thence returning to Manhattan over the tracks on the south side of the bridge.

The Public Service Railroad Commission has denied the application of the Brooklyn Heights Railroad, the Nassau Electric Railroad and the Coney Island & Brooklyn Railroad for a rehearing on the grant of a certificate last July to the Manhattan Bridge Three-Cent Fare Line, which proposes to construct a surface road across the bridge and Manhattan to the North River via Canal Street. The commission told the company that unless it obtained operating rights across Manhattan it would refuse to approve the exercise of a franchise later on. The Brooklyn companies in their application declared the Three-Cent Fare Line would never be able to get the operating rights.

Railway Affairs in Detroit

The Michigan Supreme Court, sitting at Lansing, Mich., on Feb. 1 decided that Detroit does not possess the right under its charter to submit the Moore municipal ownership plan for acquiring the street railways and other utilities to a vote of the people. The court holds that a general revision of the charter must precede amendments such as the one providing for this vote, and that amendments adopted otherwise are null and void. The decision nullifies the civil service and a number of other amendments made to the charter at the fall election, as well as the one applying to municipal ownership.

The city has a right to issue two kinds of bonds, one permissible by the charter limits and the other chargeable to the utility for the purpose of acquiring public utilities, according to the decision. Both Justice Blair and Justice Hooker wrote opinions, but in the main they coincide. Justice Hooker discussed at length the suggestion that if the relators have a remedy at this stage of the proceedings it must be by injunction bill and not by mandamus. Both opinions agree in that the charter of the city will not permit an amendment such as was adopted in this case, and that the plan for issuing bonds is legal.

Two courses are now open to the city to obtain the right to submit the question of municipal ownership to the voters. A complete revision of the charter can be ordered or the Legislature may be induced so to amend the home rule law that a revision of the charter will not be required.

Corporation Counsel Hally estimates that the cost of revising the charter would be about $80,000 and would necessitate the holding of four elections. If the proposal for revision carried, a primary would follow for the nomination of members of a commission to make the revision. Finally the charter in its revised form would be submitted to a vote of the electors.

On Feb. 1, 1911, the Detroit United Railway filed an answer and cross bill in the suit begun by the city to collect rent on the Fort Street line, on which the franchise is alleged to have expired. The company claims that the franchises for this line do not expire until Dec. 14, 1921, and has asked for an injunction to restrain the city from collecting rent and from interfering with the operation of cars on the line by starting suits at law or otherwise. The company alleges that the city has never demanded that the streets mentioned in the bill of complaint should be vacated and alleges that the city has no legislative authority over rates and terms under which the companies operate, as such rights were never given it by the Legislature. The company admits knowledge of the resolutions passed by the Common Council which ordered it to pay $200 rental, but denies that the city or any one else knows that the right of the company to maintain and operate railways on the streets named has expired. The company denies that its claims constitute an irreparable injury to the city; that they cloud the city's title to control of the streets, and that they embarrass the city in its dealings with other corporations which desire to operate on the streets at terms more favorable to the public than are afforded by the Detroit United Railway. On the other hand, it avers that the city has made no effort to deal with either the Detroit United Railway or other street railway companies nor taken any steps whatever to supply transportation to the public other than that given by the defendant. The answer alleges that the Common Council has never requested the company to vacate the streets named or authorized any action at law to dispossess the Detroit United Railway Company from the streets.

An agreement has been reached between the Detroit United Railway and the village of St. Clair Heights as a result of which cars will be run through the village for the accommodation of the people. Heretofore many of the cars have been turned before they reach the village boundary. The loop at this point will be removed and a double track will be built on Mack Avenue.

Estimate to Be Made of Cost of Electrifying London & Port Stanley Railway.—The directors of the London & Port Stanley Railway, London, Ont., of which S. Baker is secretary and clerk, have instructed the civil engineering department of the company to prepare estimates of the probable cost of electrifying the road between London and Port Stanley.

Mayor Whitlock's Illness Delays Matters at Toledo.—Although Brand Whitlock, Mayor of Toledo, Ohio, has so far recovered from his recent operation as to be able to sit up in bed and read, nothing is being done toward a settlement of the street railway question. It is possible that the city authorities will await the result of a vote on the proposed Geleerd bill, which will be before the Legislature at this session and which aims to make it possible for cities to purchase and operate street railways.

Convention of Manufacturers of Corrugated Steel Culverts.—The first annual convention of the manufacturers of steel culverts in the Northwestern States was held at Minneapolis, Minn. The purpose of the association is to standardize the gage and weight of the material used in culverts, to obtain adequate transportation facilities and proper freight rates, to educate the public to the value and efficiency of metal culverts and for general publicity purposes. Officers of the association are: T. M. Thompson, president; B. W. Harris, vice-president; N. V. Lux, secretary-treasurer.

Work of A. E. R. A. Reviewed in Daily Press.—The New York *Tribune* of Feb. 5, 1911, contained a long article on the American Electric Railway Association and its work with abstracts from the speeches by Arthur W. Brady, president of the association, on "The Association," and by Col. H. G. Prout, vice-president and general manager of the Union Switch & Signal Company, on "The Manufacturer," made at the annual banquet given by the American Electric Railway Manufacturers' Association to the American Electric Railway Association in connection with the mid-year meeting on Jan. 27, 1911, at the Hotel Astor, New York. The article was accompanied by portraits of the following officers of the association: Arthur W. Brady, president; Gen. G. H. Harries, second vice-president; C. N. Black, third vice-president; H. C. Donecker, secretary, and W. Caryl Ely, past-president.

Resolutions Regarding Mr. Winter's Retirement.—The following preamble and resolutions were adopted by the directors of the Brooklyn Rapid Transit Company at their meeting on Feb. 7, 1911: "Whereas E. W. Winter has declined to be re-elected a director and the president of this company; now, therefore, be it resolved, that this board has accepted Mr. Winter's decision with great regret. During the eight years in which he has been president of the company he has built up a strong and efficient working organiation, has directed the expenditure of upward of $45,000,000 in the enlargement and improvement of the transportation facilities of the company's system, has increased its gross earnings from $12,695,000 in 1902 to $21,130,000 in 1910 and its surplus earnings from $531,000 to $2,793,000, has, by his broad and intelligent appreciation of transportation needs and opportunities, removed many causes of public criticism, and by his ability, energy, sense of fairness, high ideals and independence of judgment has justly earned an enviable reputation as an executive corporate officer. In terminating official relations with Mr. Winter we assure him of our earnest appreciation of his services to the company and extend to him our best wishes for his continued success and good health; and be it further resolved, that the secretary be instructed to transmit to Mr. Winter an engrossed copy of this resolution under the seal of the corporation."

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—Feb. 2, the last day fixed for the introduction of new measures, was anticipated by a flood of bills and resolutions. There are many resolutions for extensions of electric railways now in operation and a number of resolutions extending the time for the construction of new lines. There are several workmen's compensation acts, an act to provide a telephone, water and light commission and a bill which would make it a misdemeanor for electric railways to charge more than 3 cents for passengers who are not provided with seats. Perhaps the most important happening thus far was the hearing held on Feb. 2 by the judiciary committee at which the subject of public utility legislation was taken up. The bills considered were the ones introduced by Senator Fenn, by Representatives Banks and Corey and by Representative Hotchkiss to establish a court of commerce. The last measure is fathered presumably by the New York, New Haven & Hartford Railroad. Some weeks ago President Mellen of that company suggested such a court as a substitute for the proposed new utility commision. Mr. Mellen proposed that an additional Superior Court judgeship should be created and that one of the Superior Court judges should be appointed by the chief justice to be a court of commerce for a year with power to employ such experts and assistants as he might deem necessary to carry out the law. Appeal from the proposed court of commerce to the Supreme Court could be taken only on questions of law, not of fact. The principal speakers were Representative Chandler and Prof. W. A. Henry, ex-dean of the department of agriculture of the University of Wisconsin. Mr. Chandler said that the last three Governors had favored a public utility commission and that there was a general sentiment throughout the State on the part of business men in favor of such a commission. He regretted that the proposed commerce court idea had not been advanced sooner so that it might have received the same careful consideration which was given the other public utility measures. Prof. Henry, who is now a resident of Connecticut, reviewed the work of the Railroad Commission of Wisconsin. He said that the commission in that State had met with the general approval of the corporations, the public and the press. The hearing was adjourned until Feb. 8.

Delaware.—A bill has been introduced in the House to create a public utility commission with five members to be elected by the people and to have control over all public service corporations in the State.

Indiana.—Among the measures reported for passage is Senator Netterville's bill to regulate the clearances of wires crossing railroad and interurban tracks. Representative Seidenslicker's bill to give the Railroad Commission power to compel steam and electric railroads to install block signal systems has been reported favorably. The House committee failed to bring in a unanimous report on the Wider bill to provide that no person shall be employed as an interurban motorman unless he has had one year's experience on an electric or steam railroad. The majority report, however, favored the bill. The Senate bill which provides for the examination of interurban employees and officials by the Railroad Commission was killed by the committee. Several hearings on the bill to conserve water-power sites have been held by the committee on naval resources. Representatives of the Indiana & Michigan Electric Company say that this bill would restrict further development of water-power plants to the detriment of the power industry in the northern part of the State. A number of new bills have been introduced. A Senate bill provides that at least two members of a section gang employed on a steam or electric railway shall understand English and be able to pass an examination on the flagging rules. A House bill provides that electric railways may contract with hydroelectric companies for electric power. A House bill would regulate the time and manner in which passengers shall be transported by railroads and the tolls and compensation to be paid therefor. A Senate bill would permit railroads which operate lines less than 15 miles long to charge 4 cents a mile for passenger service. A House bill would provide that when a public-service franchise expires a year's notice shall be given and the renewal franchise be awarded to the highest bidder.

Kansas.—The committee on railroads of the Senate, to which has been referred all public utility legislation presented in the Senate, has appointed a sub-committee to draft a committee public utility measure.

Maine.—The first month of the Legislature has seen the introduction of many bills affecting public service corporations for which committee hearings and legislative action will probably come during February. The most important general measure introduced provides for a public utilities commission to replace the railroad commission, and to exercise authority over telegraph, telephone, express and other companies. The commission would have the power to regulate capitalization, service and rates. It would number five men, with a chairman drawing $4,000 a year and the others $3,500. Appeal from a decision of the commission could be taken to the Supreme Court. This bill is more drastic than the one introduced in the Legislature of 1909 and referred to this Legislature. The most unusual special measure is for the Canadian Pacific Railway to turn over to the Aroostook Valley (Electric) Railroad its 33 miles of branch from Aroostook Junction, N. B., to Presque Isle, Me., the latter road to operate it by electricity. Two other bills would charter a line of the Aroostook Valley Railroad from Washburn to Presque Isle and from Washburn to the west line of the State. The road would afford a short line from Quebec to the Canadian harbor of St. John, N. B. A charter has been asked for a steam or electric railroad from Friendship via Waldoboro, Union, Hope, Lincolnville, Searsmont and Belmont to Belfast, by Cyrus F. Stackpole, William F. Curran, Harry J. Chapman, Bangor, Me., and others, the road to be known as the Knox County Central. Charter extensions have been asked for two years for the Lincoln County Electric Railway, which is proposed from Damariscotta to Boothbay Harbor, for the Waldo Electric Railway between Belfast and Camden, and the Winter Harbor & Eastern to run from Winter Harbor to Cherryfield or vicinity. A charter is asked for the R. & T. Cement Railroad to take over the Rockland, South Thomaston & Owl's Head Electric Railway, and extend it to Tennant's Harbor and Port Clyde. Two railroad taxation bills have been introduced. One is the bill introduced in five previous Legislatures for a valuation of railroads and taxation according to valuation. The other was introduced by Representative Pattangall, and provides for an increase of the limit for railroad taxation to 6 per cent of the gross receipts. The present tax is a percentage of gross receipts graded according to the receipts per mile, with the limit at 5 per cent. Two other bills concern the Wiscasset, Waterville & Farmington narrow-gage steam railroad and also may affect the Lewiston, Augusta & Waterville Electric Railway. One of them would extend the charter of Waterville & Winslow Bridge Company and revive the plan by which the narrow-gage road from Wiscasset was once expected to enter Waterville.

New York.—A bill has been introduced in the Assembly to limit to 5 cents the rate of fare which may be charged by a steam or an electric railway for transportation between two stations in the Boroughs of Manhattan and the Bronx. A bill has also been introduced in the Assembly to require street railways in cities to carry school children at half fare. Governor Dix has transmitted to the Senate the appointment of W. A. Huppuch as a member of the Public Service Commission of the Second District of New York to succeed John N. Carlisle, Watertown. On Feb. 1, 1911, the Governor was reported to have stated that he had not yet considered the appointment of a successor to Edward M. Bassett as a member of the Public Service Commission of the First District. Mr. Bassett's term of office expired on Feb. 1.

Ohio.—Representative Meyer Geleerd, of Toledo, has completed his municipal ownership bill. It would permit municipalities to own and operate street railways, lighting plants and water plants, with the privilege of furnishing commercial service. In the construction of new municipal lines the consent of owners of abutting property will not be necessary. Bonds for the purchase of public-service properties are not to be included within the present limit for cities, but only after a vote of the people at a regular election or a special election called for that purpose. The committee on labor of the House has recommended the Calvey bill, which would provide for closed vestibules to protect conductors in the winter.

Financial and Corporate

New York Stock and Money Market

Feb. 7, 1911.

The stock market has been fairly active during the past week and prices have remained firm at the advances recorded since the middle of January. There is undeniably a very much better tone in the market and traders are beginning to believe that there will be moderate business during the spring, even if prices do not advance materially. The excellent bond market is the brightest feature of the situation. There is a healthy demand for all good issues.

The money market continues to be very easy. Rates to-day were: Call, 1¾@2½ per cent; 90 days, 3¼@3½ per cent.

Other Markets

There was only moderate trading in traction shares last week in the Philadelphia market. For the most part prices held firm. Both Rapid Transit and Union Traction closed to-day at about the figures quoted a week ago.

In the Chicago market there has been less activity in tractions. A few small lots of Chicago Railways certificates, mostly Series 2 and 3, have been sold at former prices, but Series 1 has been out of the market.

Massachusetts Electric shares are still sold in odd lots in the Boston market, but prices are unchanged. Boston Elevated has been under some selling pressure and within the week prices have sagged about two points.

In the Baltimore market some United Railways stock has sold in the neighborhood of 17½ and the bonds have continued to be active at unchanged prices.

Quotations of traction and manufacturing securities as compared with last week follow:

	Feb. 1.	Feb. 7.
American Light & Traction Company (common)	a288	a288
American Light & Traction Company (preferred)	a105	a105
American Railways Company	a45	a45
Aurora, Elgin & Chicago Railroad (common)	a42¾	a44½
Aurora, Elgin & Chicago Railroad (preferred)	a87	a85
Boston Elevated Railway	a129¾	a128
Boston Suburban Electric Companies (common)	a16	a16
Boston Suburban Electric Companies (preferred)	a71	a71½
Boston & Worcester Electric Companies (common)	a10	a9
Boston & Worcester Electric Companies (preferred)	a40	40
Brooklyn Rapid Transit	77½	78¾
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	83⅞	84⅛
Capital Traction Company, Washington	128¾	129⅞
[illegible]	a195	a2[illegible]
Chicago & Oak Park Elevated Railroad (common)	*3	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a93	a93
Chicago Railways, ptcptg., ctf. 2	a25½	a25¼
[illegible]	a9	a9
[illegible]	a6[illegible]	a6¼
[illegible]	*6[illegible]	*6[illegible]
Consolidated Traction of New Jersey	a74	a75½
Consolidated Traction of N. J., 5 per cent bonds	a105	a105
Detroit United Railway	a72	72
General [illegible]	a[illegible]	a[illegible]
Georgia Railway & Electric Company (common)	a120	a123
Georgia Railway & Electric Company (preferred)	a88	a88
Interborough-Metropolitan Company (common)	19¾	19½
Interborough-Metropolitan Company (preferred)	54	a53¾
Interborough-Mtropolitan Company (4½s)	79	78⅞
Kansas City Railway & Light Company (common)	a22	22
Kansas City Railway & Light Company (preferred)	a71	71
Manhattan Railway	137¾	*137¾
Massachusetts Electric Company (common)	a18	a18½
Massachusetts Electric Companies (preferred)	a85½	a88
Metropolitan West Side, Chicago (common)	23	21
Metropolitan West Side, Chicago (preferred)	68	67
Metropolitan Street Railway, New York	*19½	*19½
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	72⅜	71½
Northwestern Elevated Railroad (common)	a23	a22½
Northwestern Elevated Railroad (preferred)	a63	*63
Philadelphia Company, Pittsburgh (common)	53	53
Philadelphia Company, Pittsburgh (preferred)	44½	44½
Philadelphia Rapid Transit Company	20⅛	20½
Philadelphia Trcation Company	*86½	*86½
Public Service Corporation, 5 per cent col. notes	a96½	a96½
Public Service Corporation, ctfs	a101½	*103½
Seattle Elcetric Company (common)	a110	a110½
Seattle Electric Company (preferred)	a101½	a101½
South Side Elevated Railroad (Chicago)	a70	a70
Third Avenue Railroad, New York	a11	11
Toledo Railways & Light Company	a9	8
Twin City Rapid Transit, Minneapolis (common)	a110	a110¾
Union Traction Company, Philadelphia	a47¾	a47¾
United Rys. & Electric Company, Baltimore	a18⅛	a18
United Rys. Inv. Co. (common)	44⅞	47¾
United Rys. Inv. Co. (preferred)	69¾	74¾
Washington Ry. & Electric Company (common)	a38	a36
Washington Ry. & Electric Company (preferred)	a89½	a89
West End Street Railway, Boston (common)	a91	a92½
West End Street Railway, Boston (preferred)	a105	*105
Westinghouse Elec. & Mfg. Co.	68	69
Westinghouse Elec. & Mfg. Company (1st pref.)	119	*119

a Asked. *Last sale.

Report on the Proposed Consolidation and Other Matters in Boston

Under date of Jan. 14, 1911, the Senate of Massachusetts received a report from the Board of Railroad Commissioners and the Boston Transit Commission sitting jointly on various matters relating to the three following subjects:

First, the acquisition by the Boston Elevated Railway of stocks and bonds of other street railway companies, or for the acquisition of the property and rights of other street railways in any other way. Second, extensions of the existing contracts for the use of subways and tunnels. Third, methods for continuing the advantages of a single control of the systems of the Boston Elevated Railway and the West End Street Railway.

With regard to authorizing the Boston Elevated Railway to acquire and hold the stock and securities of other railways, the joint board refers to a report made by it to the General Court of 1910, under date of Jan. 8, 1910, in which it arrived at the general conclusion that "a holding bill should be enacted permitting the Boston Elevated Railway to acquire and hold the stock of other street railway companies." The joint board, after a review of its previous conclusions, states that by virtue of existing contracts and leases between the company and the Commonwealth and the City of Boston advantage cannot be taken of the general law relative to the consolidation of street railways. The question thus placed before the joint board was whether consolidation by special act presented the necessary elements of feasibility and practicability. While it has always been conceded that a special consolidation bill could be drafted no action can be required under such a bill without the consent of the Boston Elevated Railway; an act providing for consolidation which would have to be permissive would remain inoperative unless accepted. The joint board, however, deems it advisable to include a special provision relative to consolidation in its draft bill. This section, taken as a whole, is in aid of the consolidation. It will tend to bring about consolidation of all those companies in which the Boston Elevated Railway may become a stockholder, for in case such consolidation is not effected the company must by Jan. 1, 1924, cease to be a stockholder, and dispose of any stock or bonds of other street railways which it may then hold.

Section 1 of the draft bill permits the Boston Elevated Railway, subject to the approval of the Board of Railroad Commissioners, to acquire the stocks and bonds of any other street railway, except the West End Street Railway, incorporated under the laws of the Commonwealth which has a physical connection with any railway now owned, leased or operated by the company. The company, subject to the approval of the board, may issue its own stocks or bonds, to provide means for payment, but their par value shall not exceed the par value of the securities so purchased, and in no case shall the amount of the bonds so issued exceed the amount of bonds so purchased. The company is not authorized to acquire the stocks or bonds of any street railway organized after Jan. 1, 1911, whose lines may hereafter be constructed where the Boston Elevated Railway now owns, leases or operates a street railway. Section 2 provides that whenever the Boston Elevated Railway acquires 35 per cent of the stock of another company it shall notify all stockholders of the company in question that it will purchase all remaining stock tendered to it within six months thereafter at a price per share equivalent to the average price paid by it for such 35 per cent.

Section 3 states that the stocks or bonds of other street railways acquired by the Boston Elevated Railway shall not thereafter be sold or otherwise disposed of except with the consent of the board, but this provision shall not be so construed as to impair the rights of the creditors of the other company. Section 4 states that no contracts relating to joint traffic or to the sale of power between the company and any other street railway in which it owns any shares shall be valid until approved by the board. Section 5 states the provisions of section 10 of chapter 500 of the acts of the year 1897 relating to tolls or fares shall be extended to include within a distance of 5½ miles from the State House the road of any street railway in which the Boston Elevated Railway has acquired 35 per cent of the stock under the provisions of this act, but this shall not be con-

sidered as affecting the said section so far as it relates to roads owned, leased or operated by the company at the time of the passage of this act. Section 6 relates to taxation. Section 7 states that for the purpose of effecting any consolidation the vote of a majority in interest of the stockholders of each of the contracting corporations shall be sufficient but such consolidation shall not be valid and binding until its terms have been approved by the board. The authority granted to the Boston Elevated Railway to acquire stocks and bonds of other street railways shall terminate on June 10, 1922, and not later than Jan. 1, 1924, the said company shall dispose of any stock or bonds of any other street railway acquired by it under the provisions of this act, and shall have no authority to hold the same thereafter. Section 8 relates to the provisions for enforcing this act or preventing violation thereof. Section 9 states that the act shall take effect upon its acceptance by the company by vote of its board of directors and return thereof to the secretary of the Commonwealth within six months of its passage.

The report on extensions considers whether it is advisable to provide in advance of the expiration thereof for extensions of existing contracts for the use of the Tremont Street subway, the Washington Street tunnel and the East Boston tunnel, and if so on what terms. The report says that there should be a uniform date upon which the leases, not only of the existing subways and tunnels, but also of subways and tunnels to be constructed should expire. The finances of the subway and tunnel construction, including both those completed and those proposed, should provide for the payment at maturity or renewal of all bonds heretofore or hereafter issued by the city for subway and tunnel purposes. The joint board holds that the question of extending the existing leases should be dealt with as part of a comprehensive plan of unifying the finances of subway and tunnel construction. Such a plan has been worked out in a draft bill which provides for a 25-year extension of the three existing lines—the Tremont Street subway, the East Boston tunnel and the Washington Street tunnel—so that all will expire on July 1, 1936. Provision is also made that the lease of the Boston Hill tunnel now under construction and of the Riverbank subway which is authorized but not yet begun, shall expire on the same date. This would extend the lease of the Tremont Street subway for about 19 years, of the East Boston tunnel about 14 years, and of the Washington Street tunnel for about three years, and would extend for four years the lease of the Beacon Hill tunnel if such lease is made in 1912 to run for 20 years from its opening for use. On the other hand, the Riverbank subway lease would be shortened by about three years. The leases for the proposed South Station tunnel would also expire on the same date. The bill calls for no change in the rates of rental payable under existing leases until after such leases have expired. From and after the respective dates of expiration the rental is fixed at the uniform rate of 4½ per cent per annum for all subways now constructed or authorized. The bill only establishes this rate of rental, however, until July 1, 1936, as it has not seemed wise to undertake a definite rate for a longer period than 25 years.

Certain provisions are made to give the city such opportunity to require such further extension as may be found necessary to provide for the retirement of all its subway and tunnel bonds at maturity, but the period of such extension beyond 1936 is limited to 25 years as the maximum.

A dissenting statement with regard to the foregoing report on leases was made by George G. Crocker, of the Boston Transit Commission, who thinks it desirable that a more definite provision should be made for payment of the bonds which have been issued or may be issued for subway and tunnel construction. He believes, first, that 4½ per cent for the extension of city leases is insufficient and, second, that the plan proposed, while it does not require, nevertheless contemplates, the fixing of the rental from 1936 on a basis which will not wipe out the indebtedness of the city until 25 years from 1936, or practically in 1961. In his belief the payment of interest and sinking fund requirements calls for a rental of approximately 4¾ per cent per annum, continuing until the general expiration of all leases on July 1, 1950. This would give an average term of use of 40 years.

The report on the proposed consolidation of the Boston Elevated Railway Company and the West End Street Railway Company says that the advantages of a single control of these two systems are obvious. The present lease would expire 11 years hence. There are only two methods by which a continuance of this single control can be assured. These methods are either a long extension of the present lease or consolidation. The joint board is emphatically in favor of consolidation, and recommends unanimously that the acts of 1908 should be amended by extending to Dec. 30, 1911, the time within which the consolidation may be authorized by the stockholders of the two companies. The members of the joint board, however, are unable to agree as to the dividend rate which should be fixed upon the purchased stock, which would become the second preferred stock of the Boston Elevated Railway. The majority report recommends an 8 per cent rate rather than have the consolidation indefinitely postponed. The change from the present 7 per cent lease rate to the proposed 8 per cent would mean an additional fixed charge of $125,000 a year.

The minority report states that an increase to 8 per cent would be an unwarranted gift to stockholders and would to that extent impair the ability of the Boston Elevated Railway to serve the public properly.

Boston & Worcester Street Railway, Boston, Mass.—The Boston & Worcester Street Railway has petitioned the Railroad Commission for authority to issue 4370 shares of preferred stock at $110 a share. The proceeds of 2970 shares will be used to purchase or cancel a like amount of common stock, and the remainder will be applied to floating indebtedness.

Brooklyn (N. Y.) Rapid Transit Company.—At the meeting of the directors of the Brooklyn Rapid Transit Company on Feb. 7, 1911, the following officers were elected: A. N. Brady, chairman of the board of directors; Col. T. S. Williams, president; C. D. Meneely, vice-president, member of the board of directors and treasurer; J. F. Calderwood, vice-president; J. H. Bennington, secretary. The announcement of the retirement of Edwin W. Winter as a director of the company and as president was made in the Electric Railway Journal of Feb. 4, 1911.

Central Pennsylvania Traction Company, Harrisburg, Pa.—The Central Pennsylvania Traction Company paid a dividend of 4 per cent on Feb. 1, 1911, on the 42,000 shares of capital stock of the company, which have a par value of $50 a share, but with only $46 heretofore paid in. The dividend is credited in payment of an assessment of 4 per cent called for payment at that date. The stock of the company, $2,100,000, is now half paid in.

Chicago (Ill.) Railways.—Mention was made in the Electric Railway Journal of Feb. 4, 1911, of the purchase of $15,000,000 of first mortgage, 5 per cent bonds of the Chicago Railways by Harris, Forbes & Company and the National City Bank, New York, N. Y. It is announced that this entire issue has been disposed of, a considerable amount of the bonds going abroad. Judge Grosscup in the United States Court has entered an order permitting Andrew Cook, who purchased the property of the Chicago Consolidated Traction Company, the right to take up a number of receiver bonds against the company. The amount and the holders of the bonds follow: North Shore Electric Railway, $160,728; Chicago Electric Transit Company, $98,500; Cicero & Proviso Railroad, $381,200; Ogden Street Railway, $49,772, and North Chicago Electric Railway, $160,728.

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—An increase from $2,000,000 to $3,500,000 in the capital stock of the Cleveland, Painesville & Eastern Railroad has been approved by the stockholders.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—On Jan. 31, 1911, the Fairmont & Clarksburg Traction Company purchased the stock and bonds of the Fairmont & Mannington Railroad and assumed active control of the road.

Federal Light & Traction Company, New York, N. Y.—At the annual meeting of the stockholders of the Federal Light & Traction Company, M. D. Thatcher was elected a director to succeed Dunlevy Milbank.

Greenville, Spartanburg & Anderson Railway, Anderson, S. C.—The Duke interests propose to incorporate the Piedmont & Northern Railway with a capital stock of $5,000,000 to take over the Greenville, Spartanburg & Anderson Railway and other properties which they control but which are not yet specified. The company will be incorporated by J. B. Duke, Somerville, N. J.; B. N. Duke, New York City; Samuel McRoberts, New York City; W. S. Lee, Charlotte, N. C.; Ellison A. Smyth, Greenville, and Lewis W. Parker, Greenville.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—The Indianapolis & Cincinnati Traction Company, reorganized, has made a mortgage under date of July 1, 1910, to the Central Trust Company, New York, N. Y., and E. Francis Hyde, New York, N. Y., as trustees to secure an issue of $4,850,000 of bonds divided into classes A, B and C. Of these bonds $1,300,000 of class A will be used to retire the receiver's debts, etc., and classes B and C will be used largely for extensions, improvements, etc. The German-American Trust Company, Indianapolis, Ind., has charge of the exchange of receiver's certificates for the new bonds.

Interstate Railways, Philadelphia, Pa.—The leases of the several properties controlled by the Interstate Railways are made to the following companies and run as follows: (a) Properties in and around Wilkes-Barre (Wilkes-Barre & Wyoming Valley Traction Company) from Jan. 1, 1910, for 800 years to the Wilkes-Barre Railway. (b) Those in and around Norristown, Reading and Lebanon (United Traction Company, Reading, etc.) from April 1, 1910, for 900 years to the Reading Transit Company. (c) Those in and around Trenton (Trenton Street Railway, etc.) to the Trenton & Mercer County Traction Corporation. (Incorporated in New Jersey on Oct. 6, 1910, by Geo. W. MacPherson, Rankin Johnson and Oscar T. Crosby, Warrenton, Va.). (d) Those in Delaware County, Pa. (Delaware County & Philadelphia Electric Railway), were leased July 1, 1910, for 999 years to the Southern Pennsylvania Traction Company. (Incorporated in Pennsylvania in June, 1910, with $10,000 stock.) Incorporators, Geo. R. Webb, Baltimore, Md.; Oscar T. Crosby, Warrenton, Va.; Wm. Henry Snyder, Chestnut Hill, Pa. Treasurer, D. L. Evans, 111 North Hanover Street, Pottstown, Pa.) (e) Those in Delaware (Wilmington & Chester Traction Company, etc.) to the Wilmington & Philadelphia Traction Company from July, 1910, for 999 years. The two leasing companies last named are under the same management and executed the leases simultaneously.

Joliet & Southern Traction Company, Joliet, Ill.—Judgment for $10,000 was entered in the Kane County Circuit Court in Illinois on Feb. 6, 1911, against the Joliet & Southern Traction Company in favor of John M. Raymond, Aurora. On the petition of Mr. Raymond, Joy Morton and other creditors, Judge Carnes appointed H. A. Fisher, Joliet, president of the Joliet & Southern Traction Company, and Daniel Peterkin, representing Joy Morton and the Continental National Bank, Chicago, Ill., as receivers to operate the road.

Kentucky Securities Corporation, Lexington, Ky.—Brief mention was made in the ELECTRIC RAILWAY JOURNAL of Feb. 4, 1911, page 243, of the incorporation of the Kentucky Securities Corporation. The company will take over the Lexington & Interurban Railways. It has an authorized issue of $2,500,000 of 6 per cent preferred stock and $2,500,000 of common stock. Of the preferred stock $2,160,240 will be issued immediately and of the common stock $2,053,100 will be issued immediately in exchange for securities of the Lexington & Interurban Railways and for cash. The officers of the Kentucky Securities Corporation follow: Percy M. Chandler, Philadelphia, president; John A. McCarthy, Philadelphia, vice-president; J. K. Trimble, Philadelphia, secretary and treasurer.

Meadville & Conneaut Lake Traction Company, Meadville, Pa.—Judge Buffington, in the United States Circuit Court at Pittsburgh, has confirmed the sale of the property of the Meadville & Conneaut Lake Traction Company and the Meadville Street Railway at foreclosure on Jan. 14, 1911, to a committee representing the bondholders of the companies, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 21, 1911, page 135.

Missouri & Kansas Interurban Railway, Kansas City, Mo.—W. B. McKinley, president of the Illinois Traction System, on behalf of his associates, is negotiating with W. B. Strang, president of the Missouri & Kansas Interurban Railway, for an interest in that company and operating rights which will provide an entrance to Kansas City for lines which Mr. McKinley and his associates have in contemplation as part of their program for new construction. The McKinley interests now operate the street railway systems in Atchison and Topeka.

Ocean Shore Railway, San Francisco, Cal.—The sale of the property of the Ocean Shore Railway, under foreclosure to the bondholders, of which mention was made in the ELECTRIC RAILWAY JOURNAL of Jan. 28, 1911, has been confirmed by the court.

Oklahoma Railway, Oklahoma City, Okla.—A meeting of the stockholders of the Oklahoma Railway has been called for Feb. 24, 1911, to vote on a proposal to increase the authorized capital stock of the company from $3,000,000 to $15,000,000, of which $5,000,000 is to be preferred stock and $10,000,000 common stock, and to sanction an increase in the bonded indebtedness of the company to $12,000,000.

Philadelphia (Pa.) Rapid Transit Company.—It was announced on Feb. 1, 1911, that 350,000 of the total of 600,000 shares of the stock of the Union Traction Company had been deposited with the officials of that company, or more than the number required to authorize the proposed refinancing plan.

United Railways Investment Company, San Francisco, Cal.—The series E 6 per cent notes of 1908 of the United Railways Investment Company, which are due Feb. 15, 1911, will be paid, principal and interest, at maturity at the office of the New York Trust Company, New York, N. Y., or at the office of the United Railroads of San Francisco, San Francisco, Cal.

Wilmington & Southern Traction Company, New Castle, Pa.—The Wilmington & Southern Traction Company has been incorporated at Dover, Del., to succeed to that part of the Wilmington, New Castle & Southern Railway between New Castle and Delaware City, which was purchased recently at foreclosure by R. H. Richards, as noted in the ELECTRIC RAILWAY JOURNAL of Jan. 28, 1911, page 183.

Dividends Declared

El Paso (Tex.) Electric Company, 2½ per cent, common.

Federal Light & Traction Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Portland Railway, Light & Power Company, Portland, $1.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD.

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m.,	Dec.	'10	$124,874	$85,363	$39,511	$34,850	$4,661
1 "	"	'09	117,202	72,794	44,408	30,912	13,496
6 "	"	'10	934,457	503,834	430,623	201,893	228,730
6 "	"	'09	858,007	444,903	413,104	177,574	235,530

BANGOR RAILWAY & ELECTRIC COMPANY.

1m.,	Dec.	'10	$47,515	*$20,826	$26,689	$12,165	$14,524
1 "	"	'09	45,156	*22,227	22,929	11,708	11,221
6 "	"	'10	310,332	*135,600	174,732	72,089	102,643
6 "	"	'09	300,633	*131,955	168,678	70,637	98,041

CHATTANOOGA RAILWAY & LIGHT COMPANY.

1m.,	Dec.	'10	$75,659	*$47,331	$28,328	$18,862	$9,466
1 "	"	'09	64,417	*40,964	23,453	17,675	5,778
12 "	"	'10	875,078	*511,453	363,625	220,897	142,728
12 "	"	'09	771,582	*506,677	264,905	198,665	66,240

EAST ST. LOUIS & SUBURBAN COMPANY.

1m.,	Dec.	'10	$202,814	*$98,246	$104,568	$44,989	$59,579
1 "	"	'09	185,225	*94,507	90,718	45,042	45,676
12 "	"	'10	2,364,142	*1,287,604	1,076,538	541,212	535,326
12 "	"	'09	2,035,790	*1,146,746	889,044	538,398	350,646

GRAND RAPIDS RAILWAY.

1m.,	Dec.	'10	$96,274	*$59,872	$36,402	$14,349	$22,053
1 "	"	'09	90,144	*48,261	41,883	15,306	26,577
12 "	"	'10	1,132,578	*619,646	512,932	181,272	331,660
12 "	"	'09	1,029,011	*543,008	486,003	176,903	309,100

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY.

1m.,	Dec.	'10	$37,694	*$25,341	$12,353	$13,100	†$-47
1 "	"	'09	36,417	*25,423	10,994	14,687	†3,693
6 "	"	'10	292,985	*170,292	122,693	78,738	43,955
6 "	"	'09	293,088	*161,140	131,948	86,694	45,254

PORTLAND RAILWAY, LIGHT & POWER COMPANY.

1m.,	Dec.	'10	$529,969	*$233,695	$296,274	$123,333	$172,941
1 "	"	'09	432,667	*201,230	231,437	111,860	120,577
12 "	"	'10	5,638,896	*2,724,378	2,914,518	1,398,029	1,516,489
12 "	"	'09	4,818,022	*2,418,910	2,399,112	1,270,625	1,128,487

Traffic and Transportation

Tacoma Safety League

According to the *Live Wire,* which is issued by the Seattle (Wash.) Electric Company for the benefit of Stone & Webster employees in the Northwest, the Tacoma Railway & Power Company is making a great effort to reduce its accidents to the lowest possible limit and to bring its trainmen to the highest possible degree of efficiency. The claim department of the company has formed a safety league and succeeded in interesting many hundreds in the scheme, the school children being members in large numbers. This safety league has the object in view of making the public more careful in their movements. In order to make the trainmen more painstaking and to give them a clearer understanding of the reason why certain rules and methods are desirable a daily bulletin is issued. In it an attempt is made to present different phases of the transportation business, in a terse, pointed way, in terms easily understood. Occasion is taken in this bulletin to commend trainmen for meritorious work, as well as to call attention to discipline administered.

The correspondent of the *Live Wire* in Tacoma, in discussing the work being carried out, says that the examples furnished by Portland and Seattle in this respect are being followed. He continues as follows in regard to the work being done among the school children:

"We succeed in getting the attention of the children by some appropriate story which in a manner will furnish an analogy to the production and use of electricity, and then warn them of the dangers of live wires and third rails. Then we impress on their minds that street cars are an economic necessity and that they, all their lives, will be compelled to make use of them every day, and that there are certain precautions on the streets that must be taken and that certain rules in regard to the cars must be observed.

"After the lecture each child is furnished with a button, the wearing of which makes him a member of the Tacoma Safety League. The children take their impressions home and talk them over with their parents, and in this way we reach the whole family and bring about a close relation between the company and the home."

Relations Between Public Service Corporations and Public

Henry E. Huntington contributed an article on the mutual relations between public service corporations and the public to a recent special edition of the Los Angeles *Times,* in which he said:

"I am asked to say a word in regard to the relation which should exist between a public service corporation and the city which it serves.

"The question is a large one, and every phase of the situations that arise calls forth some new side of the question. In spite of this fact, however, the principles involved are simple ones—and if they are kept in mind there should be no difficulty in adjusting the points of difference as they may come up from day to day.

"In the first place, it is the duty of the public service corporation—say in the case of a street railway—to provide safety, speed and comfort to the traveling public of the city which it serves.

"In this service safety must come first and all the time, and both for the sake of the city and the sake of the operating company other questions must be secondary. The Los Angeles Railway is doing its utmost to provide this through the pay-as-you-enter type of cars and innumerable safety devices that are placed in operation, and of which in many cases the public knows nothing.

"It must provide rapid and frequent service. In many cases it is impossible to live up to the highest demand which service requires through the inability to obtain cars for the service, but on the local lines we are doing our utmost in this regard.

"The question of cars also must be taken into consideration when the comfort of passengers is considered, together with the condition of the traffic of city streets.

"There is another duty of the companies. That is to aid in the growth of the city served. We are building for the future. Many of the lines now constructed are operated at a loss, but in the end they will pay through the building up of the outlying territory and the bringing of additional thousands to the city.

"On the other hand, the city owes a duty to the financial interests that place their money in public service corporations that in their turn serve the city's needs.

"Like the corporations themselves, the city government is itself a servant of the people, and should not unnecessarily hamper a fellow servant in the carrying out of his duties.

"When a franchise is asked for to care for the city's growth, it is the duty of the city government not only to see that it is granted, but it is an additional duty, moral, at least—upon the city government—so to legislate as to make the burden upon the public service corporation as light as possible in the carrying out of its work.

"It is impossible to provide necessary lines for the growth of a city without proper franchises, and it is impossible to operate those already built without some profit from the money invested.

"When these facts are understood by the city, and when the duties of the corporations to the city are understood by the corporation officials, there is little difficulty in reaching any fair compromise.

"The average man is a pretty fair-minded individual and wherever it is possible to reach his ear with straight facts it is comparatively easy to settle any dispute at once and without argument."

Petition for Near Side Stops in Memphis.—The Memphis (Tenn.) Street Railway has been petitioned by citizens to stop its cars on the near side of the street.

Increase in Wages for Employees.—The employees of the Roanoke Street Railway received an increase in wages of 1 cent an hour, effective on Feb. 1, 1911.

Social Rooms for Employees.—The York (Pa.) Railways has fitted up social rooms in the city for its employees, and in the spring the company will add a reading room containing the latest books and magazines for their use.

Increases in Wages in Houston and Galveston.—The Houston (Tex.) Electric Company and the Galveston (Tex.) Electric Company, both controlled by Stone & Webster, Boston, Mass., have increased the wages of the motormen and conductors in their employ 6 per cent.

Appearance of Kansas City Trainmen.—The Metropolitan Street Railway, Kansas City, Mo., recently ordered its trainmen to wear white collars and ties while in service, since which a marked improvement in the appearance of the men has been noted at the monthly inspections.

Complaint Against Increasing Fares.—The Public Service Commission of the Second District of New York has received a complaint from residents of Bolivar, Pa., against the Western New York & Pennsylvania Traction Company, protesting against the increase in rates which the company proposed to put into effect on Feb. 5, 1911.

Change in Fare Between Wilmington and New Castle.—The Wilmington, New Castle & Southern Railway, New Castle, Pa., has announced a change in fare over its line between New Castle and Wilmington. Hereafter the fare will be 10 cents each way. Coupon tickets, however, good for the round trip will be sold for 15 cents.

Agreement Between Schuylkill Railway and Its Employees.—An agreement has been entered into between the Schuylkill Railway, Girardville, Pa., and its employees regarding wages and terms of service which will cover a period of two years. According to the new agreement the employees will receive an increase in wages of 15 cents per day and will be required hereafter to work one-half hour less than heretofore each day.

Loops Suggested in Downtown St. Louis.—The United Railways, St. Louis, Mo., has suggested to the joint United Railways committee of the Municipal Assembly of St. Louis a plan for the operation by the company of a number of loops in the downtown section of the city which would require grants of franchises on three streets. The construction of the new loops would, it is thought, tend greatly to reduce congestion, particularly in the rush hours.

Prizes for Subway and Elevated Motormen in New York.—The Interborough Rapid Transit Company, New York, N. Y., has announced that prizes amounting to 10 per cent of the monthly wages of motormen operating subway and elevated trains will be awarded to the four men who show the best records on the coasting clocks with which the elevated and subway trains are being equipped. The installation of these clocks has been referred to previously in the ELECTRIC RAILWAY JOURNAL.

Complaint in Regard to Transportation of Newspapers Dismissed.—The Public Service Commission of the Second District of New York has closed upon its records the complaint of Morris Manson, Rochester, against the New York State Railways as to the refusal of that company to carry newspapers and packages upon its cars in Rochester. An arrangement now in effect by the company provides for carrying newspapers on date of issue or the forenoon of the following day on the front vestibule of all schedule cars, at 25 cents per 100 lb., in accordance with the provisions noted in the item "Handling Newspapers in Rochester," which was published in the ELECTRIC RAILWAY JOURNAL of Feb. 4, 1911, page 241.

Another Hearing Ordered on Service in Albany.—The Public Service Commission of the Second District of New York has appointed a further hearing to be held Feb. 16, 1911, on the order to show cause directed against the United Traction Company, Albany, N. Y., as to why it should not purchase large double-truck passenger cars for use upon its Pine Hills and West Albany lines. The reply of the company to the commission in regard to service over its Pine Hill and West Albany lines based on the investigation made for the commission by Charles R. Barnes, the electric railroad inspector of the commission, was referred to at length in the ELECTRIC RAILWAY JOURNAL of Jan. 28, 1911, page 183.

Portland, (Ore.) Employees as Stockholders.—B. S. Josselyn, president of the Portland Railway, Light & Power Company, Portland, Ore., has arranged to permit employees of the company to purchase stock of the company at $75 a share, and many men have availed themselves of the privilege of becoming stockholders by subscribing for five shares of stock each. Mr. Josselyn in commenting on the plan was quoted as follows: "The employees have the privilege of buying as much as they can pay for; we have placed no limit on the amount that may be purchased, but it is understood that the purchasers will hold the stock a reasonable length of time, at least during their period of service with the company, otherwise the object sought would be defeated."

Operating Agreement Reported Between Detroit United Railway and Michigan United Railway.—It is stated that the Detroit (Mich.) United Railway and the Michigan Railway are ready to enter into a traffic contract for through passenger and freight traffic between Detroit on the south and Lansing and Kalamazoo on the north. One line of the Michigan United Railway extends from Jackson to Lansing, and another to Kalamazoo. There is an arrangement with the Fruit Belt Line, which operates between Kalamazoo and Benton Harbor, for the quick shipment of freight between Detroit and Chicago, a boat line between Benton Harbor and Chicago filling in the link. Heretofore shipments made by the Detroit United Railway to any of the northern points had to be reloaded at Jackson. A new line between Lansing and Owosso will be in operation within a short time, and it is said that a line will be built from Morrice to Durand and Flint, so that the Detroit United Railway will have a double connection with the Michigan United Railway. Arrangements for passenger and freight terminals in Detroit have not been announced.

Dominion Commission Fixes Suburban Electric Railway Rate Outside of Montreal.—The Board of Railway Commissioners for the Dominion of Canada, at a meeting in Montreal, on Jan. 25, 1911, refused the applications of the Montreal Terminal Railway and the Montreal Park & Island Railways, which operate in the rural districts surrounding Montreal, for the right to adopt a standard of 3 cents per mile and a minimum fare of 5 cents. Mr. Hague and Duncan McDonald, general manager, representing the two companies, contended that unless the railways were granted the 3-cent mileage rate their ability to expand would be destroyed. Chairman Mabee, in refusing the application, stated that as the representatives of the companies had acknowledged the possibility of operating the roads on a standard tariff of 2½ cents per mile, and as that tariff was in use by the other rural electric railways, the board was willing to allow the adoption of the 2½-cent tariff. Judge Mabee pointed out that a number of other Canadian rural electric railways were competing with steam railways on the 2½-cent basis, and, although they had a 3-cent tariff, none of them charged this rate in rural districts.

Stopping Cars at Street Crossings in Denver.—On Dec. 20, 1910, the Denver (Col.) City Tramway adopted a rule which prescribes that all cars within the district bounded by Nineteenth Street, Broadway, West Colfax Avenue, Fourteenth Street and Wynkoop Street stop for the reception and discharge of passengers with the rear end of the car or train clear of the property line. The rule says: "Within this district cars moving in opposite directions must not pass one another within the space included between the two property lines of any street. Outside of the above-mentioned district cars will stop to take on or let off passengers, where there are crosswalks with the steps opposite the crosswalk, and, where there are no crosswalks, with the rear end of the car or train of cars clear of the curb lines. Cars moving in opposite directions must not pass one another while both are in motion within the space included between the two curb lines of any street or, where there are no curb lines, the traveled roadway. In passing cars near intersections, or which are stopped to either discharge or take on passengers, trainmen should exercise proper judgment and have their cars under reasonable control."

Fares Out of Baltimore.—Attorneys Morris A. Soper and Allen C. Girwood, acting on behalf of the Federated Association of the Suburbs of Baltimore, filed a complaint with the Public Service Commission of Maryland as the direct result of the action taken by the company some time ago, when it discontinued the sale of commutation tickets to residents of certain suburban communities. In support of the application for a reduction in the rates on the suburban lines the petition avers that the returns to the company from lines which serve the territories in which the complainants reside are more than sufficient to pay expenses of operation, maintenance, repair, renewal and a fair return on the capital invested. Chairman Ambler, of the Public Service Commission, has decided in the case of Marion G. Dinsmore and others against the United Railways & Electric Company that the fare from Sparrows Point to Baltimore shall not be reduced from 15 cents to 10 cents. The chairman said that the charge of 15 cents is not exorbitant and that the situation did not warrant an investigation by the commission to ascertain whether the finances of the company warranted the reduction in fare asked by Mr. Dinsmore and others.

Another Whitridge Letter.—Frederick W. Whitridge, receiver for the Third Avenue Railroad, New York, N. Y., whose correspondence with the Public Service Commission republished in book form at his own expense has attracted considerable attention, sent a letter recently containing a refund of 20 cents to a complainant whose housekeeper had dropped a quarter into one of the fare boxes on a pay-as-you-enter car. Change had been refused by the conductor, but he had given a receipt for the money. Mr. Whitridge cashed the receipt. He wrote as follows: "I inclose to you the 20 cents called for by the voucher of the conductor. The reason why that financial transaction could not have been concluded on the platform is that owing to the disabilities of most of the people who take the position of conductor—which in some cases are moral and in others intellectual—it has been found best to have a fare box to which the conductor cannot have access, and therefore a quarter once dropped in the box is gone beyond recall. We are trying a box in which the coin, when dropped in registers and after having thus recorded itself, may be obtained by the conductor for the purpose of making change, but most of our fare boxes are built on the first principle. I am sorry your housekeeper was inconvenienced, but as you will see from the inclosed 20 cents, I am still endeavoring to do right."

Personal Mention.

Mr. R. L. Payne has been appointed master mechanic of the San Angelo (Tex.) Street Railway to succeed Mr. H. H. Lyttle.

Mr. E. T. Thomas has been appointed superintendent of the Abilene (Tex.) Street Railway to succeed Mr. B. M. Dunlap.

Mr. John W. Harris has been elected president of the San Angelo (Tex.) Street Railway to succeed Mr. Samuel Crowther.

Mr. F. H. Murray has been elected treasurer of the Seattle-Tacoma Short Line, Seattle, Wash., to succeed Mr. A. G. Pritchard.

Mr. Joseph Winship has been elected vice-president of the Seattle-Tacoma Short Line, Tacoma, Wash., to succeed Mr. A. C. Ewing.

Mr. W. R. Nelson has been appointed chief engineer of the power station of the Springfield (Ohio) Railway to succeed Mr. F. E. Shank.

Mr. A. H. Chitty has been appointed comptroller of the International Transit Company, Sault Ste. Marie, Mich., to succeed Mr. J. S. Wynn.

Mr. S. Z. Dean has been appointed master mechanic of the Westmoreland County Railway, Pittsburgh, Pa., to succeed Mr. R. O. Kline.

Mr. Clyde M. Graves has been elected first vice-president of the Spokane & Inland Empire Railroad, Spokane, Wash., to succeed Mr. A. L. White.

Mr. Richard E. Cochran has been appointed associate to Mr. George S. Schmidt, who has been counsel for the York Railways for several years.

Mr. L. F. Wyman has been appointed master mechanic and electrical engineer of the Loyal Railway, Ballard, Wash., to succeed Mr. F. C. Henage.

Mr. Charles McCloud has been appointed comptroller of the Corning & Painted Post Street Railway, Corning, N. Y., to succeed Mr. F. E. Ramsen.

Mr. N. M. Fruehauf has been appointed acting auditor of the San Francisco Vallejo & Napa Valley Railroad, Napa, Cal., to succeed Mr. Charles E. Watkinson.

Mr. C. C. Graham has been appointed master mechanic and engineer of the power station of the Alexandria (La.) Electric Railways to succeed Mr. L. A. Williams.

Mr. W. M. Case has been appointed engineer of the power station for the Clarksville Railway & Light Company, Clarksville, Tenn., to succeed Mr. R. L. Edwards.

Mr. R. G. Arthur has been appointed general manager, superintendent and purchasing agent of the Douglas (Ariz.) Street Railway to succeed Mr. Daniel A. O'Donovan.

Mr. Alfred Anderson was appointed purchasing agent of the Metropolitan Street Railway, New York, N. Y., effective on Feb. 1, 1911, to succeed Mr. F. C. Nordsick, resigned.

Mr. L. E. Loomis has been appointed acting chief engineer of the Twin City & Lake Superior Railway, Minneapolis, Minn., to succeed Mr. H. L. Laughlin, who died recently.

Mr. M. C. Harper has been elected general manager of the Oklahoma, Kansas & Missouri I. U. Railway, Miami, Okla. Prior to entering promotion work Mr. Harper was for many years connected with the steam railroads of Texas and Oklahoma.

Mr. Winfield A. Huppuch, chairman of the Democratic State Committee of New York, has accepted the appointment by Governor Dix of New York as a member of the Public Service Commission of the Second District, to succeed Mr. John N. Carlisle, whose term of office has expired.

Mr. Smith Hood, general superintendent of the Fairmont & Clarksburg Traction Company, Fairmont, W. Va., which has taken over the Fairmont & Mannington Railroad, will hereafter perform the duties relinquished by Mr. Wm. M. Laws as vice-president and general manager of the Fairmont & Mannington Railroad.

Mr. Leroy F. Wynne has been appointed claim agent of the Georgia Railway & Electric Company, Atlanta, Ga., to succeed Mr. C. H. Matthews, whose appointment as assistant superintendent of transportation of the company is noted elsewhere in this issue. Mr. Wynne was formerly chief clerk to Mr. W. H. Glenn, manager of railways of the company.

Col. Theodore Roosevelt visited the car houses of the Third Avenue Railroad, New York, N. Y., on Feb. 3, 1911, as the guest of Mr. Frederick W. Whitridge, receiver of the company, and Mr. James A. Roosevelt, general superintendent of the company, who is a relative of Col. Roosevelt. Col. Roosevelt manifested particular interest in the club rooms which have been fitted up for the employees in the various car houses and in the benefit association which has been organized among the employees of the Third Avenue Railroad.

Mr. C. H. Matthews, claim agent of the Georgia Railway & Electric Company, Atlanta, Ga., has been appointed assistant superintendent of transportation of the company. Mr. Matthews entered the employ of the company as a stenographer in the claim department in 1903. In the fall of 1904 he was appointed a claim investigator, and in 1906 he was appointed claim agent of the company. Mr. Matthews was graduated from the high school in Atlanta in June, 1898, and was connected with Sanders, Swann & Company, Atlanta, in the cotton business for about three years. Before becoming connected with the Georgia Railway & Electric Company, Mr. Matthews was secretary to the general passenger agent of the Southern Railway at Washington.

Mr. C. D. Meneely, secretary and treasurer of the Brooklyn (N. Y.) Rapid Transit Company, was elected first vice-president, member of the board of directors and treasurer of the company at the annual meeting of the directors on Feb. 7, 1911. Mr. Meneely was formerly a member of the firm of G. R. Meneely & Son, with offices at Watervliet, N. Y. He entered the employ of the Brooklyn Rapid Transit Company on Feb. 1, 1896, as auditor, about the same time that Colonel Williams, the new president of the company, became connected with the company. In 1898 Mr. Meneely was appointed assistant secretary and assistant treasurer of the company. On Feb. 28, 1900, he was elected secretary and treasurer of the company and has continued in that capacity since that time.

Mr. Ira A. McCormack has been appointed assistant general superintendent of the New York Central & Hudson River Railroad, with headquarters at the Barclay Street station of the company in New York. Mr. McCormack was formerly manager of the Grand Central Station of the New York Central & Hudson River Railroad in New York and general superintendent of the electric division of the company out of New York and was also assistant to the general manager of the company. Mr. McCormack has been connected with steam and electric railroading for many years. He has been general superintendent of the Brooklyn (N. Y.) Rapid Transit Company, vice-president and managing director of the Syracuse (N. Y.) Rapid Transit Company and general manager of the Cleveland (Ohio) Electric Railway Company.

Mr. H. M. Hobart, the well-known author and consulting engineer, was tendered a dinner in London, Eng., on Jan. 21, by his professional friends in view of his coming departure from Great Britain to join the engineering staff of the General Electric Company at Schenectady. Mr. H. F. Parshall presided and about 100 of Mr. Hobart's friends were present. Mr. Hobart is a native of America and a graduate of the Massachusetts Institute of Technology. He went to Europe in 1895 to join the British Thomson-Houston Company. From 1900 to 1903 he was chief designing engineer of direct-current machinery with the Union Elektricitäts Gesellschaft. Since that time he has been consulting engineer in London and has always given a great deal of attention to the design of motors for railway service and to other electric railway problems.

Mr. R. A. Harman, whose election as vice-president of the Cleveland Railway was announced in the ELECTRIC RAILWAY JOURNAL of Feb. 4, 1911, is primarily a manufacturer. He was a director of the East Cleveland Railway before its consolidation with the city roads, and has been a director of the Cleveland Railway since it was organized. Mr. Harman was secretary of the Cleveland Electric Railway from 1893 to 1900, when he was chosen vice-president. He served three years, a portion of the time under the administration of Mr. Henry A. Everett, until the consolidation of the Cleveland City Railway and the Cleveland Electric Railway, in June, 1903, when he resigned and Mr. C. E. Emery took the office as a representative of the Cleveland City Railway interests. This, therefore, makes the second time Mr. Harman has held the office. He was also interested in some of the Everett interurban and other electric railway properties.

Prof. Milton J. Brecht, superintendent of public schools of Lancaster County, has been nominated by Governor Tener of Pennsylvania as a member of the State Railroad Commission for five years. Professor Brecht is a native of Lancaster County, where he was born in December, 1855. He attended the public school until he was 16 years old, when he began to teach a district school. Later he attended Millersville Normal School, from which he was graduated in 1875. Subsequently he became principal of the schools of Manheim, Lancaster County. He was chosen principal of the Mount Joy Soldiers' Orphans School in July, 1880, and served in that capacity until 1883, when he was elected county superintendent of schools, to which position he was elected nine successive terms. He has been a trustee of Millersville State Normal School for 10 years. Professor Brecht is an Independent Republican and was twice a candidate for Congress, but was defeated both times.

Mr. F. M. Johnston, auditor of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., whose appointment as purchasing agent of the company was noted in the ELECTRIC RAILWAY JOURNAL of Feb. 4, 1911, began his railroad career in the office of the superintendent of the Chicago, Burlington & Quincy Railroad at Keokuk, Ia., in 1888. In 1891 he resigned from this company to accept the position of car accountant in the office of the auditor of the Keokuk & Western Railroad, and was advanced to various positions in the auditor's office until that road was taken over in 1901 by the Chicago, Burlington & Quincy Railroad. From 1901 till 1909 Mr. Johnson was connected with the operating department of the Chicago, Burlington & Quincy Railroad as chief clerk to various division superintendents and was subsequently appointed auditor of the Fort Dodge, Des Moines & Southern Railroad. In addition to his duties as auditor of that company Mr. Johnston will hereafter act as purchasing agent of the company.

Col. Timothy S. Williams, vice-president of the Brooklyn (N. Y.) Rapid Transit Company, was elected president of the company at the meeting of the board of directors on Feb. 7, 1911, to succeed Mr. Edwin W. Winter, who resigned that day as president of the company, and whose resignation as a director and intended resignation as president was noted in the ELECTRIC RAILWAY JOURNAL of Feb. 4, 1911. Mr. Williams was born in Ithaca, N. Y. He was graduated from Cornell University in 1884 and immediately entered public life. During the term of Roswell P. Flower as Governor of New York Mr. Williams acted as his secretary and since the close of Mr. Flower's term as Governor he has been connected with the Brooklyn Rapid Transit Company. Mr. Williams is chairman of the board of directors of the American Railway Traffic Company and is a director and officer of the subsidiary companies of the Brooklyn Rapid Transit Company. He is also a director of the Port Jefferson Light & Power Company, Sultepec Electric Light & Power Company, Toluca Electric Light & Power Company and the Mechanics' Bank of Brooklyn. He is a member of the University Club, Cornell University Society and other clubs.

Mr. W. E. Squires has been appointed superintendent of the lines of the Indiana Union Traction Company at Marion, Ind., to succeed Mr. B. E. Parker, whose appointment as superintendent of transportation of the Rockford & Interurban Railway, Rockford, Ill., was announced in the ELECTRIC RAILWAY JOURNAL of Jan. 28, 1911. Mr. Squires began work with one of the constituent companies of the Indiana Union Traction Company in the mule-car days and has been promoted from time to time until recently he has been in charge of the Marion Flyer of the company as conductor. This is a train *de luxe* and as conductor of it and through his long previous service in Marion Mr. Squires is well known in all Grant County and between Marion and Indianapolis. The Marion *Chronicle* after complimenting Mr. Squires on his appointment took occasion to use his career as a text for an editorial on honest and faithful service by employees in the ranks which it concluded as follows: "The man who can wear the uniform of a conductor for 15 years without acquiring a trace of 'swell head' is not likely to catch it now. The qualities described in this editorial are within the reach of every one; they do not constitute genius, but they are better than genius. Common sense and good humor are within the reach of every one and they are the most valuable equipment any man can have for the duties of life and for the enjoyment of life."

Mr. J. H. Bennington, who has for some time been private secretary to Col. T. S. Williams, the newly elected president of the Brooklyn (N. Y.) Rapid Transit Company, was elected secretary of the company at the meeting of the directors on Feb. 7, 1911, to succeed Mr. C. D. Meneely, whose election as first vice-president and treasurer of the company is noted elsewhere in this column. Mr. Bennington has had a very interesting career with the Brooklyn Rapid Transit Company. He entered the employ of the company 16 years ago and served for a time as conductor on the Halsey Street line. Subsequently he was appointed a transfer agent. In 1899 he took a clerkship with the treasurer in the general office of the company. In 1903 the work of Mr. Bennington came to the attention of Colonel Williams and he appointed Mr. Bennington his private secretary. Mr. Bennington's election to the position of secretary of the company comes in recognition of his faithful and efficient service.

J. H. Bennington

OBITUARY

M. L. Newton, consulting engineer of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., is dead.

J. McM. Smith, formerly vice-president and general manager of the Northern Indiana Railway, South Bend, Ind., is dead.

William O. Seymour, a member of the Connecticut Board of Railroad Commissioners for 23 years, is dead. He was born in Ridgefield, Conn., on Oct. 16, 1833. In 1868 and in 1869 he was a member of the General Assembly. Last fall he was elected a representative from Ridgefield again.

E. John Nichols, the late secretary of the T. H. Symington Company, Baltimore, Md., was made the subject of the following resolution which was passed by the board of directors of that company Jan. 31, 1911: "Resolved, That in the untimely death of E. John Nichols, who, starting with the company as a stenographer at its formation, by ability and untiring industry rose to the position of secretary and who by his unfailing courtesy endeared himself to all his associates, this company has suffered irreparable loss."

Louis R. Alberger, president of the Alberger Condenser Company and of the Alberger Pump Company, New York, N. Y., died at his home in New York on Jan. 31, 1911. Mr. Alberger was born at Buffalo, N. Y., on April 10, 1864. After leaving Yale he went into business with his father, J. L. Alberger, Buffalo, who was experienced in the vacuum processes used in the salt industry. In 1887 Mr. Alberger entered the employ of Henry R. Worthington in New York, but left the Worthington employ in 1901 and formed the Alberger Condenser Company. The Alberger Pump Company was formed in 1907.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Humboldt & Eastern Railroad, Eureka, Cal.—Application for a charter has been made in California by this company to build a railway from Eureka to the Sacramento Valley, via Trinity County. Capital stock, $250,000. Incorporators: W. S. Clark, C. H. Palmtag, H. J. Jackman, Brousse Brizard, William Metson and G. L. Dillman. [E. R. J., Dec. 18, '09.]

***Sacramento Short Line Railway, Oakland, Cal.**—Incorporated in California as a subsidiary company of the United Properties Company. Capital stock, $10,000,000. Incorporators: B. M. Aikens, Gavin McNab, R. P. Henshall, L. Elkins, G. W. Mordecai and F. L. Stewart.

***San José Short Line Railway, Oakland, Cal.**—Incorporated in California as a subsidiary of the United Properties Company. Capital stock, authorized, $80,000. Stock issued, $44,000. Incorporators: Gavin McNab, B. M. Aikens, R. P. Henschell, Luther Elkind, George W. Mordecai, N. Schmulowitz, R. V. Whitney and F. L. Stewart.

***High River, Saskatchewan & Hudson Bay Railway, Ottawa, Ont.**—Application for a charter will be made by this company to the Parliament to build an electric railway in the provinces of Alberta and Saskatchewan, thence to Pas, in the northwest territories.

***Joliette & Lake Manuan Colonization Railway, Ottawa, Ont.**—Application for a charter has been made in Ontario to the Parliament by this company to build a steam or electric railway from Joliette, Que., to Montreal.

***Wilmington & Southern Traction Company, New Castle, Pa.**—Incorporated in Pennsylvania to succeed that part of the Wilmington, New Castle & Southern Railway between New Castle and Delaware City which was purchased recently at foreclosure by R. H. Richards, as noted in the Electric Railway Journal of Jan. 28, 1911, page 183.

FRANCHISES

Alameda, Cal.—The Southern Pacific Railroad will ask the City Council for two new franchises, one along Clement Avenue from Alameda mole to the High Street bridge, then to Fruitvale and Hayward; the other franchise is for a freight line along Blanding Avenue and Atlantic Avenue.

Hayward, Cal.—The Oakland Traction Company has asked the City Council for a franchise to build an electric railway from the foothills to the Southern Pacific Railway station in Hayward.

Modesto, Cal.—The South San Joaquin Improvement Company has asked the Board of Trustees for a 25-year franchise to build an electric railway system over certain streets in Modesto.

Petaluma, Cal.—The Petaluma & Santa Rosa Railway will ask the Petaluma Trustees for a franchise to extend its line through certain streets in Petaluma along the river to Point Pedro, where it will meet steamers and convey passengers and freight to San Francisco. E. M. Van Frank, president.

San Francisco, Cal.—Thomas W. Forsyth, representing the United Railways, has received a franchise from the Board of Supervisors to build a double-track extension on Parnassus Avenue and Ninth Avenue, in San Francisco.

Vallejo, Cal.—The San Francisco, Vallejo & Napa Valley Railway, Napa, has asked the City Council for a franchise to change the present existing span construction of its electric railway along Sonoma Street, from Illinois Street north to the city limits of Vallejo, to a single-pole-T-arm construction.

Belfast, Maine.—The Waldo Street Railway, Belfast, has received a two years' extension of time to its franchise in which to build its projected 19-mile electric railway between Belfast, Northport and Camden. John A. Jones, Lewiston, is interested. [E. R. J., Sept. 18, '09.]

Syracuse, N. Y.—The Syracuse Rapid Transit Railway has been granted permission by the Public Service Commission to extend its double tracks in Willow Street, and to abandon its tracks in Lodi Street between Green Street and Willow Street, in Syracuse.

Chillicothe, Ohio.—The Scioto Valley Traction Company, Columbus, has received a franchise from the City Council to extend its railway on Bridge Street, in Chillicothe.

***Middletown, Ohio.**—E. E. Hackett, engineer of the American Rolling Mills, has received a franchise from the City Council to build an electric railway in Middletown.

Brantford, Ont.—The City Council has passed a bylaw providing that the Grand Valley Railway, Brantford, construct a line to Holmedale by April 1, in default of which the company must forfeit the franchise for operating there.

Johnson City, Tenn.—The Johnson City Traction Company has received a franchise from the City Council to build a 2-mile extension from Johnson City to the Soldiers' Home.

Memphis, Tenn.—The Memphis Street Railway has received a franchise from the City Commissioners to extend its railway on Lane Avenue, from Montgomery Street to Claybrooke Street, in Memphis.

Spokane, Wash.—The Spokane Traction Company will ask the City Council for franchises to extend several of its lines in Spokane. About 2 miles of track will be built.

TRACK AND ROADWAY

***Mobile, Ala.**—C. V. Shoub, Mobile, is promoting plans for the construction of a 1½-mile street railway in Mobile.

Edmonton (Alta.) Radial Railway.—This company will award contracts during the next two months for building 4 miles of track in Edmonton. It expects to place the line in operation during the coming summer.

Phoenix (Ariz.) Railway.—This company is now building a 3-mile extension from Phoenix to Glendale.

Little Rock Railway & Electric Company, Little Rock, Ark.—This company is rebuilding 2 miles of track in Little Rock, using Lorain high T-rail and hard steel center work from the Wm. Wharton, Jr., & Company. Creosoted ties are used on stone ballast and paving consists of creosoted blocks.

Oakland (Cal.) Traction Company.—This company will place contracts during the next six weeks for building 20 miles of new track in Oakland. J. Q. Brown, purchasing agent.

United Railways, San Francisco, Cal.—This company expects to build about 3 miles of new track in San Francisco during 1911.

Quebec Railway, Light & Power Company, Quebec, Can.—About 6 miles of track will be built from Beauport to Montmorency Falls by this company during this year.

Colorado Railway, Light & Power Company, Trinidad, Col.—About 1 mile of new track will be constructed by this company in Trinidad during 1911.

Pensacola (Fla.) Electric Company.—This company will soon reconstruct about 1 mile of track in Pensacola.

Chicago-New York Electric Air Line Railroad, Chicago, Ill.—The stretch of track between La Porte and Chesterton reported to have been placed in operation by the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., is an extension of the Chicago-New York Electric Air Line Railroad and was opened by that company. [E. R. J., Feb. 4, '11.]

***Evansville, Ind.**—E. Q. Lockyear, Evansville, is promoting an electric railway from Paducah, Ky., to Fulton, Ky., by way of La Center, Wickliffe, Mayfield and Murray. A meeting of the Commercial Club was held at Paducah to discuss the plan and a committee of which S. B. Caldwell is chairman was appointed to look into the proposition.

Kokomo, Marion & Western Traction Company, Kokomo, Ind.—It is stated that this company will build a 27-mile extension from Kokomo to Frankfort during 1911.

Tri-City Railway, Davenport, Ia.—This company expects to build about 35 miles of track between Davenport and Muscatine and 5 miles of new track in Davenport and Muscatine during this year.

Joplin & Pittsburg Railway, Pittsburg, Kan.—This company will extend its railway to connect with the city park in Pittsburg.

***Shelbyville, Ky.**—N. B. Waugh, Shelbyville, Ky., is promoting the construction of an electric railway from Shelbyville to Mount Eden. He has stated that financial backing for the construction of the line has been secured and is now engaged in securing the rights-of-way.

Berkshire Street Railway, Pittsfield, Mass.—This company will build a 30-mile extension to connect Great Barrington and Huntington and Berkshire.

Crystal Valley, Mich.—Irving C. Harwood, Crystal Valley, states that as yet nothing definite has been arranged for building an electric railway between Crystal Valley and Pentwater. [E. R. J., Jan. 28, '11.]

Granite City Railway, St. Cloud, Minn.—One mile of new track will be built by this company in St. Cloud during 1911.

***Irondale, Mo.**—James P. Ward, Irondale, states that preliminary arrangements are being made for building an electric railway and hydroelectric plant in Irondale.

Billings (Mont.) Traction Company.—This company announces that preliminary arrangements are now being made and that construction will begin in the spring on its projected line in Billings. John A. Connolly, Muskogee, is interested. [E. R. J., Nov. 26, '10.]

New Jersey Rapid Transit Company, Sea Isle City, N. J.—A 2-mile extension will be built by this company in Suffren during 1911.

Elmira, Corning & Waverly Railroad, Elmira, N. Y.—This company has awarded contracts and has completed more than half of the 12-mile line from Elmira to a connection with the Corning & Painted Post Street Railway in Corning. Equipment and material have been purchased and power is obtained from the Elmira Water, Light & Railroad Company. The Corning division, when constructed, with the Waverly division now in operation, will make a continuous line from Waverly to Corning.

Hudson & Manhattan Railroad, New York, N. Y.—About 3 miles of new track will be built by this company in New York during 1911.

Auburn & Syracuse Electric Railroad, Syracuse, N. Y.—This company will double-track several of its lines in Syracuse during 1911.

North Carolina Traction Company, Danbury, N. C.—It is reported that this company has let a contract to the Propst Contraction Company, Charlotte, to build from Winston-Salem north to Rural Hall, Lawsonville and Danbury, N. C., and Floyd, Va. This work includes one 600-ft. steel bridge and several trestles. H. P. MacKnight, Southern Pines, N. C., chief engineer. [E. R. J., Jan. 28, '11.]

Columbus, Mt. Vernon & Mansfield Railway, Columbus, Ohio.—Active preparations are being made by this company for building an electric railway to connect Columbus, Mansfield and Mt. Vernon, with a probable extension to New Albany and Johnstown. L. P. Stevens, general manager. [E. R. J., Nov. 26, '10.]

Sapulpa (Okla.) Interurban Railway.—This company will build a 15-mile extension from Sapulpa to Tulsa during 1911.

Mount Hood Railway & Power Company, Portland, Ore.—This company will construct a 22-mile extension from Portland to Bull Run during 1911.

Philadelphia & Easton Electric Railway, Doylestown, Pa.—It is said that this company is considering plans for building an extension from Lansdale to Doylestown in the spring.

Bristol (Tenn.) Belt Line Railway.—This company will build about 2 miles of new track in Bristol during 1911.

Lake View Traction Company, Memphis, Tenn.—This company, which holds franchises for the construction of 7 miles of track in Memphis, announces that it will now proceed with the construction of the line. W. W. Hayden is engineer.

El Paso, Tex.—Richard Burgess, El Paso, it is reported, is interested in a plan to build a 100-mile electric railway from Engle, N. M., to Febans, Tex.

Citizens Railway, Waco, Tex.—About 6 miles of track will be built by this company in Waco during the present year.

Danville Railway & Electric Company, Danville, Va.—About 1 mile of new track will be built by this company in Danville during 1911.

Morgantown & Southern Railway, Morgantown, W. Va.—This company is building and expects to soon complete 5 miles of new track in Morgantown.

Chicago & Wisconsin Valley Railroad, Madison, Wis.—This company has awarded a contract to Brown Land & Lumber Company, Rhinelander, for 20,000 ties. It has also let a contract for 1,000 tons of steel rails to be used in building its interurban railway to connect Janesville, Friendship, Easton, Portage, Lodi, Middleton, Wausau, Stevens Point, Madison and Merrill. Allen T. Russell, Chicago, general manager. [E. R. J., Feb. 4, '11.]

Wausau (Wis.) Street Railway.—This company is planning to double track Main street in Wausau during the summer.

SHOPS AND BUILDINGS

Northern Electric Railway, Chico, Cal.—This company is considering plans for building a new depot at the corner of Fifth Street and Main Street in Chico.

United Railways of San Francisco, San Francisco, Cal.—This company will place contracts during the next two weeks for the construction of an addition to its repair shops in San Francisco. The cost is estimated to be approximately $16,000.

Illinois Traction System, Champaign, Ill.—This company is considering plans for building a freight station at Peoria. The structure will be one story, 63 ft. x 130 ft., of brick construction. The cost is estimated to be about $10,000.

Detroit (Mich.) United Railway.—This company expects to build an addition to its car house on Jefferson Avenue and St. Jean Road in Detroit. The structure will be three stories, 44 ft. x 56 ft., of brick construction. Smith, Hinchman & Grylls, Detroit, architects, are taking the bids.

Michigan Central Railway, Detroit, Mich.—This company has awarded the contract to H. L. Vanderhoist, Kalamazoo, for building a freight house at Kalamazoo. The cost is estimated to be about $28,000.

POWER HOUSES AND SUBSTATIONS

Edmonton (Alta.) Radial Railway.—This company will soon purchase a 500-kw motor generator for its substation in Edmonton.

Little Rock Railway & Electric Company, Little Rock, Ark.—This company has purchased a 2500-kw Curtis turbine from the General Electric Company for its power plant at Little Rock.

Colorado Springs & Interurban Railway, Colorado Springs, Col.—A contract has been placed by this company for 2000-hp Green stokers for its power plant at Colorado Springs.

Joplin & Pittsburg Railway, Pittsburg, Kan.—This company will soon build a power plant in Pittsburg. It also expects to purchase one 400-kw generator, one 600-hp engine and one 150-hp boiler for its new power plant. William A. Satterlee, Pittsburg, purchasing agent.

Elmira, Corning & Waverly Railway, Waverly, N. Y.—This company has purchased from the General Electric Company three 3000-kw rotary converters, with transformers and switchboard, for its power plant in Corning.

Cincinnati (Ohio) Traction Company.—This company has purchased and is installing two additional 525-hp Babcock & Wilcox boilers for its Pendleton power station, equipped with Murphy furnaces.

Wilkes-Barre (Pa.) Railway.—This company expects to purchase during the next two weeks one 1500-kw low-pressure turbine, one 750-kw motor-generating set and condensing outfit, four 500-kw rotary converters and two 300-kw rotary converters. Thomas A. Wright, general manager.

Charleston Consolidated Railway & Light Company, Charleston, S. C.—This company has purchased from the General Electric Company two 2000-kw turbo generators, two 125-kw turbo exciters and three 500-kw, 550-volt motor-generator sets for its plant in Charleston.

Manufactures & Supplies

ROLLING STOCK

Electric Power Company, Vicksburg, Miss., expects to purchase two passenger cars complete with trucks.

Detroit (Mich.) United Railways has ordered from the General Electric Company 60 two-motor, 70-hp car equipments.

Shreveport (La.) Traction Company has ordered five 28-ft. 10-in. closed cars and 10 Brill 39-E trucks from the American Car Company.

South Covington & Cincinnati Street Railway, Covington, Ky., has ordered 15 semi-convertible car bodies from the Cincinnati Car Company.

Northern Ohio Traction & Light Company, Akron, Ohio, has ordered from the General Electric Company eight four-motor car equipments, including controllers.

George Wehner, 420 Habersham Street, Savannah, Ga., expects to purchase a number of gasoline motor cars for service between Tybee Island and Savannah.

Elmira, Corning & Waverly Railway, Waverly, N. Y., has ordered from the General Electric Company five GE-87 quadruple motor equipments with type M control.

Edmonton (Alta.) Street Railway has ordered 14 cars of the single-end type, 10 to be built by the Ottawa Car Company and four by the Preston Car & Coach Company.

Central Kentucky Traction Company, Frankfort, Ky., has purchased one 50-ft. baggage and refrigerator car and two Brill 27-M C B trucks from the American Car Company.

Norfolk & Southern Railroad, Norfolk, Va., has purchased four 36-ft. semi-convertible passenger and smoking cars and eight 27-MCB trucks from The J. G. Brill Company.

Western Ohio Railroad, Lake Shore Electric Railway and the Fostoria & Fremont Railway have jointly purchased four 60-ft. interurban passenger cars from the Jewett Car Company.

Citizens' Railway, Waco, Tex., noted in the Electric Railway Journal of Jan. 28, 1911, as being in the market for six cars, has purchased five 20-ft. 8-in. semi-convertible cars from the Danville Car Company.

Second Avenue Railroad, New York, N. Y., has ordered from the General Electric Company 200 two-motor GE-216 car equipments with K-39-A controllers. These motors are of the latest commutating pole type and are rated at 50-hp each.

Pennsylvania Railroad, Philadelphia, Pa., has ordered nine electric locomotives of 4000 hp each from the Westinghouse Electric & Manufacturing Company. These locomotives are exact duplicates of those that were originally built by the Westinghouse Company for the New York tunnel service.

TRADE NOTES

Joseph T. Ryerson & Son, Chicago, Ill., have elected Clyde Mitchel Carr president of the company to succeed E. L. Ryerson.

E. S. Taylor has accepted a position with Forsyth Bros. Company, Chicago, Ill. Mr. Taylor formerly was employed in the sales department of the Pullman Company.

Indianapolis Switch & Frog Company, Springfield, Ohio, has opened a sales office in the Balboa Building, San Francisco, Cal. S. I. Wailes will be in charge as coast representative.

Robert Mather, chairman of the Westinghouse Electric & Manufacturing Company, who has recently returned from Europe, states that business conditions in Europe, particularly Great Britain, are very satisfactory.

Western Electric Company, Chicago, Ill., has recently opened branch houses at Buffalo, N. Y.; Portland, Ore., and Milwaukee, Wis., which gives the company 23 branch houses in different parts of the United States.

G. S. Ackley, proprietor of the Ackley Brake Company, has arrived in London, Eng., after a successful business trip in South America, where he reports having received orders from different South American tramways for 842 Ackley adjustable brakes.

American Bridge Company, New York, N. Y., has been awarded the contract for the construction of foundries No. 1 and No. 2 for the Westinghouse Electric & Manufacturing Company at Trafford City. The buildings will be of steel and reinforced concrete. One will be 250 ft. wide and 500 ft. long and the other, for smaller castings, will be 65 ft. wide and 200 ft. long. The foundries are the first of three large plants that are to form the central foundry plant of the company, and where all of the foundry work will be done in the future.

Wonham, Sanger & Bates, New York, N. Y., have received orders to equip 10 cars of the Ottawa Electric Railway and the same number for the Norfolk & Portsmouth Railway with "H. B." life guards. This company also states that repeat orders have been received from the East St. Louis & Suburban Railway, the Montreal Street Railway and the Westchester Street Railway, and that a contract has been received from the Sao Paulo Tramway, Light & Power Company for the equipment of all cars with the "H. B." life guards.

ADVERTISING LITERATURE

Carnegie Steel Company, Newark, N. J., has issued stock list No. 6 of the Waverly warehouses.

Archibold-Brady Company, Syracuse, N. Y., has issued a very tasteful desk calendar and memorandum pad for 1911.

Sangamo Electric Company, Springfield, Ill., has issued bulletin No. 22 describing portable and switchboard type graphic recorders.

Massachusetts Saw Works, Chicopee, Mass., have published a small booklet entitled "The Gentleman from Missouri," which describes by comparison the way Victor saws are made.

Hart & Hegeman, Hartford, Conn., have issued catalog No. H on "H. & H. Barrier 600-Volt Switches," illustrating and describing the different types of switches, and also containing a number of price lists.

General Vehicle Company, Long Island City, N. Y., has published "Elec-Tricks" for January, 1911. It contains a view and description of the first American electric automobile and other interesting articles relating to electric commercial vehicles.

National Electric Lamp Association, Cleveland, Ohio, has printed bulletins Nos. 5C, 8B and 15, describing different styles of lamps. Bulletin No. 5C shows the Tantalum multiple lamps, No. 8B the "Mazda" miniature and low-voltage lamps, and No. 15 lamps for electric sign lighting.

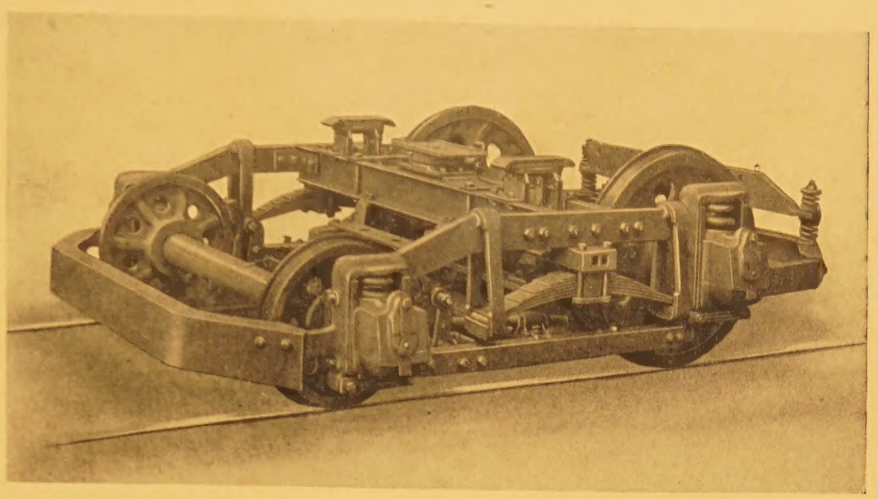
Sprague Electric Company, New York, N. Y., has published catalog No. 436 illustrating and describing "Sprague" conduit products. The company has also issued bulletin No. 111, giving a partial list of installations of engine type generators and showing a number of views of the generators after being installed.

General Electric Company, Schenectady, N. Y., has issued bulletins Nos. 4787, 4791, 4811, 4812 and 4813, which have the following titles: "Wires and Cables," "Feeder Voltage Regulators," "Drum Controllers for Industrial Service," "Small Direct-Current Belted Generators" and "Oil-Break Switches for Pole Line Service."

Joseph Dixon Crucible Company, Jersey City, N. J., has published "Graphite" for Feb., 1911. It contains articles on the "Advantage of Graphite for Boat Bottoms," "Phoenix Bridge," "The New Hudson County Court House," "American Manufacturers' Export Association" and the "Graphite Industry in the State of New York."

Electric Service Supplies Company, Philadelphia, Pa., in the "Keystone Traveler" for January, 1911, discusses the "pay-within" type of car which has been adopted by the Boston Elevated Railway. Some of the other articles in this issue are: "Protected Rail Bonds," "G. D. Arresters," "Reinforced Nose Brackets" and "Uncontrolled Power."

Ohio Brass Company, Mansfield, Ohio, has published the "O-B Bulletin" for Jan.-Feb., 1911, which contains articles on "O-B Extruded Trolley Ears," "Important Points Which Should Govern the Selection of High-Tension Insulators from the Standpoint of Line Operation," "Two New O-B Mine Hangers," "Modoc Trolley Clamp," "A Novel Mine Haulage System" and "Meeting of the West Virginia Mining Institute." This magazine is published every two months.



AMONG the large railway systems that have recently placed Brill No. 39-E Single Motor Trucks in service are the Omaha & Council Bluffs Street Railway Company of Omaha, Nebraska, and the Virginia Passenger & Power Company of Richmond, Virginia. We are now building sixty of these trucks for the Oakland Traction Company of California. Brill No. 39-E truck could be used under practically every double-truck city car. One system having this truck and also Brill No. 27-G truck in operation has found by actual test, that, equipped with 65 h.p. motors, a pair of No. 39-E trucks give service equal in every respect to a four-motor equipment of 40 h.p. motors, and this with only two motors per car to maintain instead of four. With the pony wheels toward the ends of the car, as provided in the design of this truck, the bolster centers can be placed farther apart without interfering with the platform supports, thereby lessening the overhang reducing strains and allowing the car body to be brought low. The adoption of Brill No. 39-E truck is not an experiment in economy but the recognition of an economic fact.

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